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LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

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VOL. CLXXIV., No. 3284.] WEDNESDAY, APRIL 21, 1926. [78TH YEAR.

EDITORIAL NOTES.

Critical Days.

THE newspapers in their allusions to the coal position at the beginning of last week said it would be a "fateful" and "critical" one; the week ended with the situation much the same as at the commencement. Not that nothing was done. On the contrary, there were meetings between the representatives of owners and miners, between the latter and the Industrial Committee of the Trades Union Congress, and between the Prime Minister and them all. The same thing has begun, and will be continued, this week, but we all hope with better result. The whole of the difficulty was centred, on the one hand, in the desire of the owners to make the minimum percentage upon base wage rates a matter of district settlements; and, on the other, in the resolute adherence of the Miners' Federation to their slogan: "Not a cent off wages; not "a second on hours." Now both these attitudes are opposed to the spirit and the literal meaning and intention of the Report of the Royal Commission. It may be questioned whether it was a diplomatic move on the part of the owners to suggest district settlements. It is the Miners' Federation with whom they have to deal; and headquarters of labour in the mining industry do not intend to relinquish a shred of their possessed power by any devolution to the districts of wage settlements. Thus the Federation would not, and will not, contemplate the slightest movement in that direction. As to the posture of the Federation in regard to reduction of wages or increase of hours, the Report of the Royal Commission was directed to a specific end. Without the report, all who had studied the position knew that the economic facts were of such a character that all concerned in the industry would have to make some sacrifice if its circumstances are to be brought into better state. But the leaders in the Miners' Federation, despite their knowledge of the economic facts, and without rejecting any part of the report which they think may be helpful to their policy, adhered to their decision that there should be no downward adjustment of wages to circumstances, and that the alternative of more working time to enable greater output per man should not be conceded. To put their position shortly, they are not prepared to make any temporary sacrifice to help the industry to pull through; and they do not indicate how prosperity is to be revived, or whence the money is to come to satisfy their resolve, seeing that on present output wages have only been maintained by the country spending in nine months much over 20 million pounds sterling, in order that the Federation and the owners, with the help of the Commissioners, might find a way—not to perform miracles, but to formulate a commonsense and practical programme which would conduce to a higher standard of affairs in the industry.

What the Federation were doing last week was to obstruct giving effect to the report of the Commissioners by the attitude that they want improvement and prosperity brought about, but, so far as the miners are concerned, on a non-contributory basis. This, too, notwithstanding that the subsidy cannot go on for ever, and the offer of the Government of temporary financial assistance to help the poorest coal areas while steps are being taken to give effect to the recommendations of the Commissioners. But it is idle for the Federation to reject both courses by means of which the miners may make some contribution towards conditions which will tend to greater prosperity. They must pull their weight; if not, they will have to face worse conditions than those which now exist. If the Federation think their attitude will compel the Government to continue the subsidy, they are much mistaken. The Commissioners put no qualification to their denunciation of subsidies, and to their definite recommendation of discontinuance in this instance at the end of April. The country will not tolerate any suggestion that there should be continuation, after keeping more than faithfully the bargain of nine months ago. There are also signs that some of the members of the Industrial Committee of the Trades Union Congress, which consists of leaders of all the great unions, are not disposed to countenance the subsidizing of one industry at the expense of other industries and the workers in them, many of whom are earning less money, through the depression of trade and international competition, though they are working longer hours than the miners.

It is the one hopeful ray in the beclouded industrial skies that the level-headed leaders in other unions—though certain of those engaged in transport are promising support by refusing to handle coal should there be a strike of miners—see the effect such an event would have upon the interests of their own unions, and so are working hard to avert the great disaster. Negotiations and interviews are to be continued this week; and, during the past week-end, it was thought the outlook was brightening. As a matter of fact, the Miners' Federation are finding promises and vagueness mixed-up rather confusedly, and are becoming somewhat doubtful as to the effects of going to extremes. They have good cause; for this is as certain as night follows day—that the post-strike state would be worse than the pre-strike one, and there would be less money than ever in the industry through the loss of business and trade; for other countries, with big dumps of coal at the pit-heads waiting for custom, would make the most of the stoppage of output here, despite foolish international engagements by the miners, which would affect first the public of this country, and secondly British miners by allowing other countries to enter into contracts with people abroad who have hitherto bought British coal. That custom would be difficult to recover. The Miners' Federation cannot see beyond the present hour. Their coffers, too, would be again depleted. But all-round preparations are being made. Even the Miners' Federation are not waiting to see whether there will be a strike before getting ready for one. They have been busily engaged in securing support from other unions, in the attempt to make the strike effective by putting the nation on the rack; they have obtained from the International Executive Miners' Committee a promise not to allow coal to be exported from European countries—in short, unless their best friends are able to save them, they are slipping down a precipice

which will make the conditions of their misled members worse than ever. In some districts, the owners, too—but this was more or less a formality—last Friday posted notices terminating their contracts with the men on April 30; but the probability is—it is only a "probability"—that some temporary arrangement will be made for continuing work so long as negotiations keep outside a *cul de sac*. Even the International Miners' Committee at the end of their conference in Brussels last Friday considered that conditions were brightening in this country, and that a settlement was approaching. At the same time, the position is too critical to justify the taking of any chances. Those gas undertakings which have delayed fortifying themselves with extra stocks are now participating in a scramble with others who are perturbed by the uncertainty of the position. There is a congestion of waiting railway wagons near the collieries, and at the ports coal-carrying vessels are experiencing delays to which for a long period they have been unaccustomed. Those undertakings with large coal stocks must be thankful in these critical days—whether or not there is a strike—that they did the right thing in view of the duty entrusted to them, and the character of the public service in which they are engaged. We know the cost of such action; but, cost notwithstanding, in the circumstances prudence claims first place.

Electricity Bill Overhaul.

There is some concern on the part of a few gas undertakings that the National Gas Council are taking no active steps in Parliament to oppose the Electricity (Supply) Bill; while a greater number of gas administrations are fully persuaded that the Council are pursuing the right course. There is no need whatever for any concern. The Council may not be opposing the Bill in Parliament; but that is not to say they are not in touch with the movements that are taking place. Another thing that will be done by them is to examine closely the possible effect of every amendment which is proposed, and to watch the modifications which are actually made during the progress of the Bill in Committee, with the view in relation to them of safeguarding the interests of the gas industry as taxpayers, and to endeavour to assure that no privilege is granted to the electricity industry which will be prejudicial to the interests of the gas industry. Meanwhile, further clause amendments have been put on the notice paper for consideration by the Standing Committee. Reading through them and those previously announced, one thing that strikes us is that some of them, if agreed to, would invest the Bill with beautifully mystifying complication. If the electricity industry found the Bill as drafted and submitted to the House too much to digest, it must be suffering very acute pains now that the first batch of amendments is available for examination. However, that industry is taking active measures to have the clauses overhauled so far as opportunity will now permit. Representatives of the London group of undertakings, the provincial supply undertakings (including certain municipal corporations), and the power companies met in conference last week; and they are proposing to frame amendments having for their intention the realizing of the broad purpose of the Bill, but on lines acceptable to the undertakings. Several of the large corporations are also independently moving in the matter, as they see no reason why their areas should now, or at any future time, be made to suffer in regard to the cost of electricity supply, in order that other areas shall benefit. We agree with them; while conceiving another type of development made on their own initiative which would benefit their areas, and that without any increase of officialdom or control. While all this is going on in connection with the Electricity (Supply) Bill, an equally important thing for the gas industry is to look carefully into its own affairs. The expansion of to-day will provide the preserves of to-morrow. Numerous gas men have confirmed the views which have frequently been expressed in our editorial columns, that the effective capacity of the gas industry in trading competition in the future will depend very much upon what is done to-day. The opportunity is one which must not be neglected.

Science of Coke Making.

The abstract published last week of the paper on "Coke and Coke Structure," by Mr. H. Kerr, of the Research Staff of the Joint Gas Investigation Committee of the University of Leeds and the Institution of Gas Engineers, suggests to us that it would be an excellent thing if something could be done to co-ordinate the work that is proceeding in connection with this important subject. There are several investigators in the field, and they all seem to be making research in more or less different directions. Some are considering the effects of varied temperatures upon coke structure, others the effect of blending coking and non-coking coals, and others again the effects of finely divided mineral matter upon the properties of coke. Each and all these have some influence; but we do not get much nearer the goal of knowing definitely which individually has the most effect not only upon the structure of coke, but from the economic point of view, or whether it is the combination of regulated temperature and coal blending which will lead to the more beneficial result. Naturally, we cannot expect to reach the goal in a single rapid flight; time is required. But research is being carried along in different channels; and it is a pity if there is much overlapping and duplication, while the workers might, by co-operation, be engaged in different branches. Then, when the results had arrived at a suitable point, they could be investigated, and research be commenced to ascertain whether or not the maximum result in coke quality and combustibility will be achieved by a combination of factors directed to the purpose in view, without inflicting injury upon the primary object of carbonization in gas-works.

Mr. Kerr tells us in his paper that one branch, dealing with the actual chemical and physical state of the coke produced from various types of coals, together with gas, tar, and other bye-product yields, is being investigated by the research staff of the Joint Gas Investigation Committee. Perhaps, therefore, without co-operation, this will lead to the early investigation of the effects upon coke structure of blending different types of coal, carbonized at different temperatures. Marson and Cobb have already applied themselves to examining Lessing's submissions as to the effect of finely divided mineral matter upon the properties of coke; and Greenwood and Cobb have made examinations of coke at temperatures of 550°, 850°, and 1100° C., with special relation to structure, specific gravity, and porosity, and have confirmed the results of Beilby's study that the degree of temperature or rate of heating has an important bearing upon the modification of the cell and wall structure. Other workers have found the same thing. The results of the investigations are important, and maybe directional. Cokes produced at temperatures up to 550° C. had cell walls which were relatively thick, consisting of soft material, having a specific gravity higher than the original coal, but lower than the higher temperature cokes. Between 550° and 850° C., there was a further evolution of gas, with a corresponding decrease in the mass and volume of the coke material. The shrinkage amounted to 11·4 p.ct., while the density of the coke material increased from 1·591 to 1·870. But mark this: "The cell walls became thinner and stronger, "and the maximum value for porosity was obtained." From 850° to 1100° C., there appears to be no appreciable increase in specific gravity of the coke material; but there was a further shrinkage of 11·4 p.ct. in the volume, with a fall of porosity to 45·8 p.ct. Also note this, "The cell walls had thickened considerably, giving relatively small cells." Of course, determination has still to be made of the effects upon the structure of coke of blended coals carbonized within the zones of temperatures referred to. Then the work of Sutcliffe and Evans has shown that, in the process of coke combustion, the area of surface is most important. The area of surface is a function of cell structure; and, in general, other things being equal, the greater the area of the surface of a fuel, the greater will be the combustibility, especially if the walls of the cells are thin. Thus the ideal to aim at is large surface exposed by innumerable small pores, and not a comparatively small surface of large pores, and thick cell walls.

Knowing the ideal, how are we to achieve it? It is seen from the work of Greenwood and Cobb that, at tempera-

tures between 550° and 850° C., thin and strong coke walls are realized. We also know that a requirement in carbonization is that the heat resistance of the plastic layer in the retort charge should be broken down, in order to get quicker heat transmission and more equable heat conditions throughout the charge. Now if the proper proportion of non-coking coal is mixed with a coking coal, will this enable that more rapid heat transmission and more equable heat conditions throughout the charge? If so, we could go to lower temperatures than now obtain, if the technical and economic advantage realized on the one hand is not more than counterbalanced by disadvantages on the other. At the somewhat lower temperature, Greenwood and Cobb assure us, thin and strong coke walls can be obtained. But here the gas engineer must be brought in to aid the research chemist and the physicist, because—lower temperatures assisting to improve coke structure, and blending (according to other authorities) appreciating carbonizing conditions in respect of heat transmission—determination has to be made as to whether any reduction of gas output per ton or per unit of capital expenditure on the carbonizing plant would negative the summation of advantage of an improved coke, a lower fuel account, and reduced wear and tear upon the fabric of the settings, due to the ability to use the lower temperatures.

As Mr. Kerr points out, the subject of coke structure is a very large one; and the work of studying it and its influences is really only in the first stage. This being so, cannot the gas industry with the Coal Gas and Fuel Department at the Leeds University, as the centre and head, take an independent lead in this matter, by (say) having a conference of those engaged in the various branches of this work to see whether something cannot be done to help progress by the concentration of brains upon it, and the adoption of a concerted and definite programme. The question of coke that will, through its own quality, create domestic demand is to-day one of the most important economic topics for the gas industry.

Is Riveting Doomed on Gas-Works?

THERE is good ground for the belief that Mr. J. N. Reeson, the Engineer-in-Chief of the Metropolitan Gas-Works of Melbourne, is prepared to answer the above question in the affirmative. His confidence in the welding of the joints of gas-works plant—from holders downwards—does not diminish, but increases with the experience given to him by time. His advocacy of this constructional process on various occasions during the last few years is now capped by the paper which has been read at a meeting of the Institution of Civil Engineers, and of which we gave an abstract in last week's issue of the "JOURNAL." It is seen therein that there is no inadequacy in the factors which are necessary to confidence—time and extent of the practice have together given assurance, and have proved the advantages which were sought, on *a priori* grounds, in making change from riveting to welding. So much is this the case that Mr Reeson is persuaded that welding of the joints of gas plant will in time not far distant replace riveting for most applications. It must be something like five years or more ago that Mr. Reeson first applied electric welding to the reconstruction of a gasholder which had collapsed at the South Melbourne station, and in which both the crown and side sheets were welded—the joints so treated measuring no less than 15 miles. A new holder which was subsequently built at another station was constructed exclusively with welding; and purifiers and other plant have been dealt with in like manner, with the utmost satisfaction, and without any drilling or punching for rivets. In the reconstructed holder first treated, only half-a-dozen leaks were discovered on completion of the work; and in the later new holder, the most rigorous examination failed to detect a single leak. Tests made for tensile stress have shown equality in the joints, if not superiority, to the sheets themselves. Welding also gives a good account of itself so far as corrosion and other depreciation at the joints are concerned—in fact, much greater security is found. With a capable designing staff, the welding system, Mr. Reeson states, enables great savings to be effected—in one way, through the simplification of design. The chief difficulty, so far as we can see, is to get skilled operators for the work; for upon the human factor the quality of the weld depends. But that is a matter which cannot be allowed to stand in the way of an engineer. If men competent for the work are not available, then they must be produced, and that is what Mr. Reeson did by having men specially trained for welding. Of companion importance is it that the joints should be designed with as much care as would be bestowed upon a riveted connection. There is one thing more which would be of interest, and that is to have the question of costs dealt with in comparison with riveting under Melbourne conditions. There is no question that Mr. Reeson has led the way in a definite change in connection with the construction of plant upon a gas-works.

Slot Meters and Hire Purchase.

CONSIDERATION was given last week to methods of developing the adoption of gas-consuming appliances in dwelling-houses. The matter was raised by Mr. Fulton's paper before the North British Association of Gas Managers. Among the points which we made was that one of the factors in the framing of policy in this regard must be the activities of trading competitors. Their methods vary considerably; and, in some places, practically every method that has been conceived has been applied with the view of making headway. There are low prices for energy, two-part tariffs, simple hire, hire purchase, assisted wiring, and other methods. Every gas undertaking by the new efforts of its rival is put upon its mettle. The acts of the one to get custom have to be met by counter-action. These are highly competitive times; and competitive methods have to be studied. Our rivals study applied gas sales practices; and they act accordingly. Such practices cannot be kept secret. Any attempt to do so would only defeat the object of securing new custom. New ideas to develop installation when applied must become known in a district, so that they may as well be extensively broadcasted first as last. One of the latest ideas emanates from the electricity industry. It brings the slot meter into action as an instrument to promote hire-purchase of electric wiring, fittings, and appliances. This comes under the scheme of "assisted" wiring and equipment. The origin of the slot meter was to promote the sale of gas, by the prepayment of a small sum, which includes rental for the fittings. Why confine the slot gas-meter to that class of business? Why not develop its service to the hire-purchase of new appliances where consumers wish to buy a cooker, gas-fires, or other gas-using appliances, but wish to do so on the easiest possible terms, without the obligation of heavier fixed payments. The slot meter—preferably a shilling one—would only be required instead of the ordinary meter for a period, until (say) the 2d. or 3d. per therm on the ordinary price had discharged the debt. There are, we believe, possibilities in this of no mean order—not only in the case of ordinary consumers, but for some of the existing prepayment ones. A little vision and planning might make this an excellent way of extending the hire-purchase business and the private ownership of appliances; and this would be another stay to permanence of the custom. If any gas managers are selling appliances through slot-meter payments added to the price of gas, it would be interesting to hear of the experience.

Industrial Salesmen's Conference in Glasgow.

THE Industrial Salesmen's Circle are doing work of incalculable benefit for gas. The field that industry offers to gas is almost unbounded. Industrial consumption is always a paying load, seeing that it is for most part a day demand, continuous all the year round, and substantial through a single service-pipe and meter, and each concern only calls for one account. In view of these conditions, the members of the Industrial Salesmen's Circle should be encouraged to enlarge their fund of information as much as possible; and, when this can be done from practical experience in large industrial localities, so much the better. The meetings of the Circle have been held in cities with their own particular lines of manufacturing

work. Show and demonstration rooms have been inspected by the members; factories have been thrown open to them where they have witnessed the applications of gas, and the practices in those applications to which time and experience have given approval. Descriptive papers have been read. The combined items have broadened knowledge, inspired new ideas, and thus value has been implanted of service to the official in his work and to the undertaking he serves. A week to-day the members of the Circle will be in Glasgow; and we hope, despite distance, that all gas managers will allow as many as possible of their industrial salesmen to take part in the visit, for we are confident that in that city they will see and hear things which will enhance their technical knowledge. The gas undertaking is a municipal one; so is the electricity service. The rivalry between them is keen. But the gas undertaking continues to make new records in the demand for thermal energy in gaseous form, which is the certificate of sound development management and effective method. The programme promises a full day of interest and instruction. Industrial appliances of types in general use in the city will be inspected. A paper entitled "Notes on the Application of Town Gas for Industrial Heating" will be read by Mr. J. McIsaac, of Glasgow; and there will be a discussion upon it. The afternoon will have special interest, for the members are invited to visit the world-famed biscuit works of Messrs. Macfarlane Lang and the Albion Motor-Car Works, where the application of gas to their respective processes will be witnessed. The visitors will leave Glasgow endowed with more information than when they entered the city. We have never visited a gas-works of any standing without learning something new, if not in process, in some detail. So it is with gas salesmen. We believe in their gathering knowledge from as large a field as possible; at any time they may find an opening for applying to advantage something learnt on such an opportunity as will be provided by Glasgow.

Gas-Works Effluent.

It looks very much as though good fruit will result from the persistent work which Dr. T. Lewis Bailey, Chief Inspector under the Alkali Works Regulation Act, has been doing towards promoting a better condition of gas-works effluent, so as to avoid nuisances and complaints. We see from the minutes of the Central Executive Board of the National Gas Council that the question has been referred to the Institution of Gas Engineers, in order that immediate research work may be put in hand. Much preliminary investigation has been already made by Dr. Bailey and his staff, as well as by other workers, as was especially seen by the paper which Dr. E. W. Smith and Mr. T. Campbell Finlayson read at the meeting of the North of England Gas Managers' Association last November.

Nitrate and Competition.

From what Mr. A. F. Brodie James says in the preface to the 1926 issue of his work on "Nitrate Facts and Figures," there is no question that the nitrate-producing industry is feeling the draught of competition from other fertilizers. He says that the position cannot be regarded as satisfactory for nitrate, in spite of the appearance of prosperity; and the Chilean Government have not yet, to assist in checking the growing demand for competitive fertilizers, accepted the recommendation of a Sub-Commission that the export duty of nitrate should be reduced by 10s. per ton, provided that producers lower the selling price by 20s. It is suggested by Mr. James that possible solutions of the present state of affairs are: (1) An agreement with producers of competitive articles for the adjustment of prices to meet the needs of consumers; (2) a reduction in the price of Chilean nitrate in order to stimulate demand; (3) a break-up of the Association except for propaganda purposes. The third solution is the one which is favoured by Mr. James, on the ground that it would rid the industry of expedients which interfere with the natural laws of supply and demand. This would, in effect, mean the survival of the fittest.

Government Departments and Industry.

Under the present Government, a new line of policy seems to have been introduced in relation to the preparation of legislation in connection with industry. This has been particularly obvious in connection with the Electricity Supply Bill. In that case, through the various inquiries which were made since the present Government came into power, up to the time of the drafting and publication of the measure, no opportunity was given to the electricity industry to express a concerted opinion as to the lines legislation should take, or as to what would be the best scheme for the industry. Even now there is no disposition to permit the industry a direct hearing. Much the same thing is happening in connection with the rating of machinery. The gas industry is particularly interested in this; and therefore the Central Executive Board of the National Gas Council communicated with the Ministry of Health asking that the industry might be represented on the Committee set up to deal with the matter. The reply received from the Ministry intimates that it is impossible to comply with the request, owing to the fact that the Rating and Valuation Act, 1925, specifically limits the number of members of the Committee, and that the complement of the Committee has already been appointed. The Ministry states that, in constituting the Committee, regard was not had to the representation of any particular industry or interests; and the technical members of the Committee have been selected as persons whose professional knowledge and experience qualify them for the work. The Committee will interpret the more or less general classification of plant and machinery in the Third Schedule of the Act, and will then submit the statement to the Minister of Health, who, in turn, will publish it, and consider any representations that may be made to him. This, of course, is a slight set-off to the absence of representation of such an important industry as gas; but it is not the same thing as taking part in the preparation, and discussing in Committee the details, of the statement itself.

A Darker Engineering Cloud.

The wages negotiations in the engineering trades have broken down; and the country is threatened with another heavy industrial trouble. The difficulty has been pending for a long time past; and though negotiations have been proceeding, it has been clear that the industry could no more afford the 20s. per week wage increase claimed than it could compel orders to flow in which would enable it to comply with the demand—in part or in whole. The thirty-one Unions concerned have hitherto recognized this; they know that the conditions to-day are as irreconcilable to the demand as ever. But last week they rejected an offer from the Engineering Employers' Federation to increase the war bonus from 10s. to 12s. 6d. all round, with certain conditions attached which would affect a comparatively small proportion of the workers. The Unions, it appears, have refused to submit the new proposals to their members for consideration, although the suggested extra bonus involves the industry in a direct increase in the wages load of at least 3¼ millions sterling over twelve months, and a further indirect increase of about an equal amount. The employers are convinced that to impose an additional burden upon the industry at the present time would not only seriously affect its financial stability, but would have the effect of increasing unemployment. It is believed that the Unions will now decide to take a ballot on the direct issue of a strike for an all-round advance of 20s. weekly, which is totally unreasonable. One word of warning is necessary. It is that no one must be misled by the statement that skilled engineers only receive 57s. per week. Fitters and other classes of employees are earning much more.

Road Fund.

The Commercial Road Users' Association are strongly antagonistic to the Chancellor of the Exchequer being allowed to make any raid upon the Road Fund; and they are regarding the rumours that he will in the Budget propose heavier taxes on motor transport as a bit Gilbertian, while he confesses that there is money available in the fund for purposes other than the one for which the special tax was originated. At the annual dinner of the Association, Sir Eric Geddes stated that the Roads Act of 1920 conceived a broad policy of road development—the Government and the road users accepting the prin-

ciple that the latter should be taxed heavily for the improved roads essential to the proper development of road transport. Sir Eric considers it would be a disaster if the growth of road transport were to be stunted by a dislocation and curtailment of the road improvement programme contemplated in 1920. In his view, a pledge was given to road users as to the special position and application of the Road Fund; and he believes it is one of the traditions of British Parliamentary life that pledges of the kind shall be honoured by whatever party may be in power.

PERSONAL.

Mr. H. Douglas Lees, M.C., has been appointed Engineer to the Hexham Gas Company, which position has been held for the past 35 years by his father (Mr. Herbert Lees, J.P.), who now relinquishes that office, while still retaining his position of Managing Director and Secretary of the Company.

At the annual business meeting of the Glasgow Section of the Society of Chemical Industry, Mr. S. H. B. Langlands, J.P., was elected Chairman.

Dr. James G. King, Chief Chemist, H.M. Fuel Research Station, East Greenwich, has been elected a member of the Society of Chemical Industry.

To fill a vacancy for the New Barnet Ward of the Local District Council there were four candidates; the successful one being Mr. Walter A. Barnett, Assistant Engineer and Works Manager to the Barnet District Gas and Water Company.

Changes have taken place in the personnel of the public lighting staff under the Controller of Gas Sales of the Gas Light and Coke Company. Mr. C. I. Winstone has been appointed Chief Lighting Inspector, in succession to Mr. H. Dodimead, who retired last year, after 46 years' service with the Company; and Mr. H. C. Brown has been appointed Lighting Inspector for the Goswell Road Division, in succession to Mr. J. Hinch, recently retired. The Goswell Road area includes the City of London and the Metropolitan Boroughs of Holborn, Finsbury, Shoreditch, and part of Stepney.

There was an interesting ceremony at the Blackburn Corporation Gas-Works at Greenbank, on April 15, when staff and workmen assembled to say good-bye to Mr. George Duthie, who for the last five years has been Junior Technical Assistant in the Department, on his transfer as Assistant Engineer to the Hyde Gas Company. Mr. G. P. Mitchell, the Borough Gas Engineer, handed to Mr. Duthie a mahogany timepiece and a cut-glass salad bowl, subscribed for by the staff and workmen, as a parting gift and as a token of their respect and esteem. Mr. Mitchell spoke of Mr. Duthie's excellent services to the Department, and said his departure would be a great loss to the Social Club, in which he had taken an active interest. They wished him success in his new sphere. Mr. Duthie thanked Mr. Mitchell and all who had subscribed. He subsequently entertained the workmen to refreshments.

OBITUARY.

The death is announced as having taken place at Barmouth of Mr. Thomas Brooke, who was for many years in the service of the Birmingham Corporation Gas Department, where his work in connection with carbonization made him well known throughout the industry. He was 46 years of age.

Mr. W. Anderson, at one time Engineer and Manager of the Hanover Works of the Imperial Continental Gas Association, died on April 8. He had been under medical observation for some time prior to his death, though nothing untoward was suspected until, at the beginning of March, his condition became serious. An operation performed in April was of no avail. The funeral took place at Hanover on April 12, and was attended by many friends, officials of public institutions, and representatives of the various consulates in Hanover, where, after his retirement from the gas profession, Mr. Anderson was British Vice-Consul. Sympathy is extended to his widow and to his son, Dr. G. W. Anderson, who is on the staff of the South Metropolitan Gas Company.

EVENING STAR CHAPTER, No. 1719.

Installation Convocation.

Last Wednesday, April 14, at Freemasons' Hall, Great Queen Street, London, took place the Installation Convocation of the Evening Star Chapter, No. 1719; the three principal chairs being occupied on the assembly of the companions by Ex. Comp. H. W. Packham, as M.E.Z.; Ex. Comp. A. E. Croager, as acting H. (in the unavoidable absence of Ex. Comp. S. Freeman Burrows); and Ex. Comp. Charles Hulme, P. Prov. G. Std. B. Middx., as J.

The usual preliminary business having been transacted, certificates were presented to Comp. Samuel B. Chandler and Comp. John A. Brentnall, who had been admitted at the November Convocation of the Chapter.

It was reported that a certificate had been received stating that the Chapter had qualified to become a Founding Chapter of the Freemasons' Hospital.

The installation of Principals and investiture of officers for the year 1926-27 was duly proceeded with; the complete list being as follows:

Ex. Comp.	Chas. Hulme, P.Prov.G.Std.B.Middx. P.Z.382	Z.
,,	,, Charles Clare	H.
,,	,, Rae P. Normand	J.
,,	,, Alfred C. Beal, P.Z.	Scribe E.
,,	,, William A. Surridge, P.G.St.B.	Treasurer.
,,	,, F. C. Tilley, P.Z.	D.C.
,,	,, Arthur Valon, P.Z.	Scribe N.
Comp.	W. McDowall	P.S.
,,	W. W. Hammond	1st A.S.
,,	E. G. Bartholomew	2nd A.S.
,,	G. D. Bidwell	Steward.
,,	H. Dashwood	,,
Ex Comp.	R. H. Goddard	Janitor.

Ex. Comp. Surridge (as Treasurer) submitted the report of the Audit Committee and accounts for the year 1925-26, which were approved.

A P.Z. Jewel was presented to Ex. Comp. H. W. Packham, in recognition of his services to the Chapter during his occupancy of the Z. chair during the year 1925-26.

The congratulations of the Companions were extended to Ex. Comp. Walter T. Dunn, on whom had been conferred the distinction of London Chapter Rank in connection with the Junior Engineers' Chapter, No. 2913, of which he is P.Z. It was cordially agreed to join with that Chapter in presenting him with the regalia of the office.

Bro. A. B. Potterton and Bro. T. F. C. Potterton, members of the Evening Star Lodge, were proposed for exaltation. After the concluding items of business, the Chapter was closed, and the Companions dined together in the Connaught Rooms—Ex. Comps. Hulme, Clare, and Normand in the chairs.

The traditional toasts were duly honoured. That of the "Grand Officers Present and Past" was acknowledged by Ex. Comps. W. A. Surridge, P.Z., William Belton, P.Z., and Lionel F. Dunnett, Hon. Mem. "The Visiting Companions" was proposed by Ex. Comp. William Dommett, P.Z., and replied to by Ex. Comp. John T. Wynne, P.G.W. (Grand Lodge of Victoria), Washington Chapter, Victoria. The toasts were interspersed with some excellently rendered musical selections.

FORTHCOMING ENGAGEMENTS.

April 23.—London and Southern District Junior Gas Association.—Meeting at Westminster Technical Institute.

April 23.—Society of Chemical Industry (Manchester Section).—Meeting. Paper: "The Coal Report and the Electricity Bill," by Sir Arthur Duckham.

April 28.—Industrial Gas Salesmen.—Meeting at Glasgow.

April 28.—Yorkshire Junior Gas Association.—Visit to the Stourton Works of Messrs. Brotherton & Co., Ltd.

April 30.—"B.C.G.A.," Scottish Conference.—Perth.

May 5.—Society of British Gas Industries.—Annual general meeting at the Hotel Cecil, under the presidency of the Rt. Hon. Sir Alfred Mond, Bart., M.P.

May 6.—Eastern Counties Gas Managers' Association.—Spring meeting at Ipswich.

May 6.—Midland Association of Gas Engineers and Managers.—Spring general meeting at Dudley.

May 6-7.—Refractory Materials Section of the Ceramic Society.—Meeting at Newquay.

May 7.—North of England Gas Managers' Association.—Annual general meeting in the County Hotel, Newcastle-upon-Tyne, at 2.30.

May 8.—Manchester and District Junior Gas Association.—Visit to the Blackburn Gas-Works.

May 11.—Federation of Gas Employers.—Meeting.

May 11.—National Gas Council.—Meeting.

May 13.—Murdoch Lodge, No. 3480.—Meeting.

May 14.—Southern Association of Gas Engineers and Managers.—Visit to Bristol.

May 14.—"B.C.G.A.," Manchester District Conference.—Buxton.

May 18.—"B.C.G.A.," Cheshire and North Wales District Conference.—Wallasey.

June 1.—National Gas Council.—Annual general meeting.

July 19.—Institution of Chemical Engineers.—Annual meeting.

Sept. 9.—"B.C.G.A.," Midlands District Conference.—Smethwick.

Institution of Gas Engineers.

May 11.—Advisory Committee on Education.

May 12.—Benevolent Fund, Finance Committee, Emergency Committee.

May 19.—Gas Investigation Committee.

June 7.—Council.

June 8-10.—Annual Meeting.

June 11.—Visit to Hastings.

ELECTRICITY SUPPLY MEMORANDA.

The Days Before the Fight.

What with the coal subsidy drawing to an end, the attempts to untie the knots which are opposing an agreement between the coal owners and the miners, the Budget day near at hand, and the Economy Bill, the Merchandise Marks Bill, and other items in the legislative programme with which it is desired to make headway, the Standing Committee on the Electricity Bill have not yet commenced work; but it is expected they will do so at the end of this week or the beginning of next. When they come to tackle it, they will find themselves confronted with several sheets of printed amendments which have come from the ranks of the Conservative, Liberal, and Labour members of the House; and, in certain of them, we seem to trace the hand of the Electricity Commissioners. We need not refer in detail to the proposals in these amendments, because many of them will not obtain acceptance, and so will go to add to the accumulation of litter which the measure has produced. However, they appear to cover every part of the Bill, and practically every object. They delete from, extend, and modify, in sweeping fashion, the component parts of the Bill. If a tithe of them secures adoption, the cast of the Bill as promoted will undergo a vast change. Its financial aspects will be severely attacked, and a dead-set will be made to curtail the powers of the Electricity Commissioners, and to invest with more determining authority the new Central Board, the constitution of which an effort will be made to broaden. Meanwhile, the emphatic protests and criticisms of prominent men in the electricity industry have continued. Everybody acknowledges that there are many things which could be done to improve the organization of the industry; but most people own that it would be better to achieve these in orderly manner, and not with the driving force that is contemplated by the Bill, and under the autocratic conditions embodied therein. There is a feeling that the protests and warnings of prominent individuals in the electricity industry will not have much effect, through the fragmentary way in which they have been made, and that something more should be done. It is believed that it is necessary that representatives of the industry should be organized, and a combined case be sent to the Government from the industry itself. This, it is thought, would have bigger results than anything that has yet been done. We should not be surprised to learn that there has been a movement in this direction, inasmuch as some of the most expert men in the industry see the fundamental weaknesses of the measure as presented to Parliament, and realize that it is likely to have appalling results if it goes through as drafted. Many municipal authorities—influential ones—are strongly hostile to the scheme. One of the latest is the Sheffield Corporation, a Special Committee of which has reported adversely on the Bill. Sheffield, they hold, will not be benefited; and many of the provisions, it is believed, may cause an increase in the cost of electricity in the city. The Corporation are recommended to take steps to oppose certain features of the measure.

"The Times" Astray.

"The Times" on April 12 had an editorial article which showed a distinct tendency to support the Bill, despite the expert opinions that have appeared in its columns. In it attention was called to the fact that at the second-reading stage one of the Conservative opponents of the measure proposed that it should be referred to yet another Committee. The effect of this, our morning contemporary says, would only have been to cause further delay, while it is the general opinion of a vast majority of the House that there has been enough talking, and that the time has come for action. That may be the opinion of a vast majority of the House; but it is not the opinion of an overwhelming majority of experts on the subject outside. Their opinion is that something is required which will bring about a better state of affairs in the industry; but the Bill of the Government is too drastic, too overpowering in regard to the capital expenditure that will be required, and too absolute in the control which it gives, and therefore it needs shaping by the experts of the industry most concerned. It is a weakness of the Bill that all the scheming and preparation have been carried out by Committees and Government officials without the industry (*quâ* industry) having had a voice in it. Another point made by "The Times" is that the views of the Government are perfectly defined on the point of nationalization; and they hold that their business is not "to manage or operate but to co-ordinate and control." We should like our contemporary to read the Bill carefully and, after the exercise, to explain the difference in the meanings of the terms "manage" and "control." The Government have time after time repudiated the idea of imposing on the industry any more control than is necessary to carry out the scheme; but any diligent reader of the Bill must see that it proposes rigorous control at every point. "The Times" also says: "The slow rate of progress is due to the cramping influence exercised by the interference of successive Governments, and to the lack of proper co-ordination of the results achieved by the various and far too numerous undertakings." The "cramping influence" and "interference" will under the scheme (if not revised) be more pronounced than they have ever been. That is one of the troubles. The other is that rushed development of this nature cannot be imposed upon an industry without the infliction of a grievous financial burden, which must act as a brake to, and so retard, its activities.

Linking-up.

The Electricity Commissioners are anxious to obtain the full co-operation of electricity undertakings in carrying-out definite schemes of interconnecting stations for mutual assistance. In the Yorkshire district, interlinking has been extensive; but Halifax and Huddersfield appear to have kept themselves outside such relationships. The Commissioners have recently expressed a desire that these boroughs should join the happy family, on the ground that, if they did, the needs of the undertakings could be effectively secured up to the winter of 1929-30 from the existing generating resources. The Commissioners are blessed with omniscience if they can see requirements so far ahead in such industrial areas. However, they feel assured that the course they suggest would result in general economy. In a reference to this matter, Mr. A. G. Lupton, the Chairman of the Yorkshire Electric Power Company, says that in the West Riding all the large towns, with the exception of Halifax and Huddersfield, are connected with each other through the mains of the Power Company; and the two towns mentioned he asserts could be linked-up within about a week if they desired. Mr. Lupton believes that interconnection is the right policy, and that it makes it unnecessary, so far as the West Riding is concerned, to talk about Sir John Snell's "grid-iron." He believes that the only effect of this, as proposed by the Government Bill, will be the infliction of a great cost in laying unnecessary mains. He adds: "No one would wish to bring current from (say) Birmingham to Leeds. We do not want to pay for putting down large quantities of mains in other parts of the country which ought to do for themselves what we have done for this part of the country. One hopes that the Bill will be very materially modified. Local linking-up is quite different from the grid-iron mains referred to in the Bill."

Grants for Electricity Work.

Reminder is given by a couple of minutes which recently came before the Hastings Town Council from the Electricity and Public Lighting Committee, that electricity undertakings take every possible opportunity of trying to obtain grants from the Electricity Commissioners or the Unemployment Grants Committee. At Hastings work in connection with the change of frequency is proceeding, and is not yet completed. The Electrical Engineer states that he is confident the cost of the scheme will not exceed £18,000, which covers the renewal of all transformers in the sub-stations, the renewal where necessary of transformers, and the replacement or re-winding of motors on consumers' premises, lifts, medical apparatus, vacuum cleaners, fans, and sundry apparatus affected by the change. We have heard on various occasions from the President of the Institution of Electrical Engineers of the enormous expense which would be entailed in a city like Birmingham, if the electricity undertaking is compelled to change its frequency to conform with the decrees of the Electricity Commissioners. The outlay in connection with the Hastings undertaking indicates that Mr. Chattock is not exaggerating the burden which would be imposed in the case of Birmingham, and which he declares is absolutely unnecessary. However, regarding Hastings, it is noticed that the Electricity Committee recommended that application should be made to the Electricity Commissioners for sanction to the borrowing of the estimated cost, and "for a grant towards such cost." Passing on, it is further observed that the Committee have also been obtaining tenders for the provision of high-tension overhead lines and cables, and high-tension and low-tension underground cables, transformers, &c., which are required in connection with the extension of the supply area. The estimated amounts of the respective contracts are £26,553 10s. 3d., *plus* an added 20 p.ct. in respect of contingencies, and £24,657 17s. 5d., *plus* an added 10 p.ct. for contingencies. The Committee recommended that the total estimated cost of carrying out the scheme—£68,707—should be the subject of an application to the Electricity Commissioners, and that the Unemployment Grants Committee should be petitioned for a grant towards the cost of the work as a scheme "for the relief of unemployment." This work is not a scheme for the relief of the unemployed; the proposed grant is for the relief of the electricity undertaking. It is a definite scheme for the enlargement of the area of supply, and therefore is nothing but normal work chargeable entirely to capital. However, it is found that our electrical competitors have no particular conscience in this matter, and will obtain all they can from the taxpayers of the country for purely ordinary work, under the guise of the schemes being for the benefit of the unemployed. That is frequently untrue. It is so in this case.

Savings in Housing Schemes.

Municipal electrical committees adopt all sorts of expedients for trying to induce the housing committees of local authorities to have the dwellings which they erect equipped throughout with electricity. This, of course, only applies where the electricity undertaking is a municipal possession. We have seen how poverty stricken are the arrangements for lighting in some of these schemes—economy being the excuse. In view of this tendency, there ought to be some means of imposing a minimum standard of artificial lighting upon all housing authorities. A curious thing which appears to be overlooked is that, in the houses which the municipal administrators decide shall be all-electric, it generally follows that the cheaper the other appliances—such as the cooker, electric fires, and the means of providing hot water—the more inefficient they are, so that the economy exercised initially to relieve the housing authority results in continuous uneconomy for the tenant—that is to say, uneconomy in relation to the work actually rendered by the appliances. Among the arguments which electricity committees have been advancing, is one which really originated with the gas industry. The equipment of a new house with gas-heated and heating appliances only necessitates the provision of small flue outlets for the products of combustion. Electrical men say that the provision of even such flues is unnecessary in the all-electric house. Not even ventilation and means for the escape of cooking fumes from the electric oven are mentioned as reasons for arranging for proper flue-vents; and, where these are absent, the structural economy means unhealthiness and other discomforts. But we see that the economy resulting is now being made a reason for the crediting of an electricity committee by a housing committee with the money which would have been spent on the normal equipment of a house with a coal cooking range and coal grates as a set-off against the more imposing costs of electric fittings and appliances. This has occurred at Chester, where it has been decided that, on the Bottoms Lane Estate, (*a*) one block of four houses is to be fitted entirely for electric lighting and heating, with no provision for coal fires, the hot-water circulating system being heated by electricity; (*b*) one block of four houses is to be fitted for lighting by electricity, with a coal fire in the kitchen, the hot-water circulating system being heated by the coal fire, supplemented by an electrical immersion apparatus; and (*c*) provision is to be made in both blocks for electric cookers and washing apparatus. The cost of the apparatus is to be provided by the Electricity Committee, while the Housing Committee are to give them credit for any saving effected in the building and in the fittings by reason of coal grates and gas fittings not being provided. Thus we see that electrical appliances do not mean reduced structural and equipment costs. However, if such monetary credit is given in the case of electricity, then equity suggests that it should also be given in the case of gas. As a matter of fact, the considerably greater range of household efficiency provided by gas cooking and heating appliances deserves the reward of a premium, in addition to the saving effected in structural costs, as compared with the old coal cooking range and coal grates. Convenience, reliability, and range of operation are worth much to the tenant of any house; and the superiority of gas in these respects deserves recognition by the local representatives of the ratepayers in constructing property at the expense or on the credit of the community.

Copper Control.

In the "JOURNAL" recently, the formation was noticed of the Copper Export Association in America. The New York "Daily Metal Reporter" finds that the misconception exists in England and Germany that the new organization is a sort of cartel or trust promoted for the express purpose of limiting production, increasing prices, and buying-up the bulk of standard copper stocks in London, thereby gaining control of the foreign markets. It will be interesting to electrical readers to find that all the suppositions in these directions are asserted to be without foundation. It is declared that the producers who constitute the Association while operating in different parts of the world, have one interest in common—that is, the stability of market conditions; and they have realized that such stability can only come through close co-operation at the selling end. It is said that stabilization implies the elimination of the speculative influences that have so long wrought havoc in the copper market. The Association will have for one object the depriving of the speculative element of the power it has so long enjoyed of artificially regulating prices, not only of the standard copper that remains in warehouses, but also of the refined metal. Through stabilization, it is hoped to eliminate the violent fluctuations that result not only from speculative manipulation, but from the keen and unscrupulous selling competition that has so often manifested itself. This is said to be one of the principal reasons why foreign producers have been willing to join the Association. American copper consumers, it is declared, also entertain no fears, for they know that the Association cannot be one for restraint of trade, or to bring about a concerted effort to curtail production or to fix prices. If these things were attempted, they would soon run foul of the anti-trust laws. As a matter of fact, consumers in the States welcome any move that tends to stabilize industry. That is the explanation as given by our New York contemporary.

"B.C.G.A." DISTRICT CONFERENCES.

Details of Proceedings.

We have received from Mr. J. C. Walker, the Secretary of the British Commercial Gas Association, the programmes of the forthcoming conferences at Perth, Buxton, and Wallasey; and the details are set out below.

PERTH, APRIL 30.

It has been arranged to hold a short conference at Perth during the afternoon, following the inauguration of the gas-works extensions in the morning.

The meeting is to be held in the Station Hotel, Perth, at 2.45, under the Chairmanship of Bailie James Stewart, the Convener of the Perth Corporation Gas Committee.

Mr. J. Jamieson (Edinburgh) is to read a paper on "Giving the Public a Square Deal," to be followed by a discussion.

Tea will be provided at the conclusion of the meeting.

BUXTON, MAY 14.

The conference is to take place in the Town Hall, Buxton. President: Alderman A. W. Wall, J.P., Chairman of the Buxton Gas Committee; Vice-President: Councillor A. J. Potter, Vice-Chairman of the Buxton Gas Committee.

Morning Session.

11.0 a.m. Welcome by the Mayor of Buxton, Alderman T. H. Cooper, J.P., C.C.
Opening Address by the President of the Conference.
National Publicity. Statement respecting Work and Policy. Mr. F. W. Goodenough, C.B.E. (Executive Chairman, "B.C.G.A.")
Discussion on "Putting Our Own House in Order."
With short papers as follows:
"Notes on Buxton Gas Service." Mr. F. G. Shaw, Buxton.
"Linking-Up." Mr. F. H. Robinson, Harrogate.
"Progressive Management." Mr. H. Davies, Chesterfield.
"Local Publicity." Mr. H. E. Bloor, York.
1.0 p.m. Adjournment for luncheon.

Afternoon Session.

3.0 p.m. Public Conference.
Opening Remarks by the President of the Conference.
Subject for Discussion: "Atmospheric Pollution in Relation to Health."
Address by Mr. R. Veitch Clark, M.A., M.B. (Medical Officer of Health, Manchester).
Discussion to be opened by
Alderman C. W. Buckley, M.D., M.R.C.P., M.R.C.S. (Buxton), followed by Councillor W. Shipton, M.D., M.R.C.S., L.R.C.P. (Chairman, Buxton Health Committee), and Mr. T. Buxton Flint, M.R.C.S., L.R.C.P. (Medical Officer of Health, Buxton).
4.30 p.m. Tea.

WALLASEY, MAY 18.

The conference is to be held in the Town Hall, Wallasey. President: Councillor A. H. Evans, Chairman of the Wallasey Gas Committee.

Morning Session.

11.0 a.m. Welcome by the Mayor of Wallasey, Alderman J. W. Holdsworth, J.P.
Opening Address by the President of the Conference.
National Publicity. Statement respecting Work and Policy. Mr. W. M. Mason (Manager, "B.C.G.A.").
Discussion.
Address by Mr. H. Hartley, D.Sc., on "The Efficient Modern Gas Appliance."
Local Development Methods at Wallasey. Papers by Mr. J. H. Crowther (Engineer and Manager) and Mr. H. B. Holliday (Assistant Engineer).
Discussion.
1.0 p.m. Adjournment for luncheon.

Afternoon Session.

2.30 p.m. Public Conference.
Opening Remarks by the President of the Conference.
Subjects for Discussion:
"Atmospheric Pollution in Relation to Health." Mr. R. Veitch Clark, M.A., M.B. (Medical Officer of Health, Manchester).
"Contribution of the Gas Industry Towards Reducing Atmospheric Pollution." Mr. Edwin Upton, F.S.A.A. (Treasurer, Liverpool Gas Company).
Discussion (open to the public), to be opened by Mr. T. W. Naylor Barlow, O.B.E., M.R.C.S., L.R.C.P. (Medical Officer of Health, Wallasey).
4.30 p.m. Tea.

NATIONAL GAS COUNCIL.

Central Executive Board.

The Central Executive Board of the National Gas Council met on Tuesday, April 13, at 28, Grosvenor Gardens, S.W.—Mr. D. Milne Watson in the chair.

Before the proceedings commenced, the President announced with great regret that he had received the news that their colleague, Councillor R. W. Edwards, had sustained a bereavement in the loss of his only son. A vote of sympathy was passed, all members standing.

Electricity (Supply) Bill.

It was reported that, since the last meeting of the Board, the Government's Electricity Bill had been introduced, and read a second time.

Differential Prices for Gas.

It was stated that the Committee appointed by the Central Executive Board to consider the various factors which should be taken into consideration in framing any scale of differential prices for gas had received a report from its small expert Accountant Sub-Committee. This was being carefully considered by the Committee.

Royal Commission on the Coal Industry.

The salient features of the report were referred to and discussed, and reference was again made to the necessity for every undertaking being prepared in case of trouble arising in May.

Public Health Smoke Abatement Bill.

It was reported that this was the fourth Bill dealing with the question of smoke nuisance which had been introduced since 1921—the date of Lord Newton's Report. The present Bill did not deal with the domestic smoke nuisance arising from private dwelling-houses. The Council were keeping in close touch with the Coal Smoke Abatement Society, who were endeavouring to get domestic smoke included within the scope of the Bill. A Committee was appointed which could be consulted on the matter from time to time during the passage of the Bill through Parliament.

Rating of Machinery.

It was reported that, in accordance with the decision of the last meeting of the Board, a letter had been sent to the Ministry of Health requesting that the Council should be represented on the Committee which had been set up to deal with the provisions of the Rating and Valuation Act, 1925, in connection with the rating of machinery. A reply had been received to the effect that the Minister of Health regretted that it was impossible to comply with the wishes of the Council, owing to the fact that the Rating and Valuation Act, 1925, specifically limited the number of members of the Committee, and that the complement of the Committee had already been appointed. The Ministry stated that, in constituting the Committee, regard was not had to the representation of any particular industry or interests, and the technical members of the Committee were appointed as persons whose professional knowledge and experience would qualify them for the work. The work of the Committee would consist in effect in interpreting the more or less general classification of plant and machinery contained in the Third Schedule to the Act, which provides that the Committee are to submit the statement which they are required to prepare to the Minister, and imposes on the Minister the duty of publishing this statement and considering any representations upon it that may be made to him. An opportunity is, therefore, provided, so that any of the interests concerned may make such representations as they may consider necessary.

Gas-Works Effluent.

It was decided to refer this matter to the Institution of Gas Engineers, in order that immediate research work should be undertaken on the question.

INSTITUTION OF GAS ENGINEERS.

Council Meeting.

A Meeting of the Council was held at No. 28, Grosvenor Gardens, Westminster, on Wednesday, April 14—the President, Mr. Charles F. Botley, in the chair. There were also present Messrs. John Wilkinson (Vice-President), John M. Campbell, John W. McLusky, Hubert Pooley, Charles S. Shapley, C. Dru Drury, Douglas H. Helps, John Terrace, C. Rhodes Armitage, Harold E. Copp, Leonard J. Langford (Ordinary Members of Council), William E. Caton (Midland Association), John Wilson (North British Association), W. W. Atley (North of England Association), Philip G. G. Moon (Southern Association), William H. Johns (Wales and Monmouthshire Association), and W. E. Price (Hon. Secretary).

The deaths of Mr. Charles A. W. Codgbrook, of Berkhampstead, and Mr. John Fisher, of Tottenham, having been reported, the regret and sympathy of the Council were expressed.

Applications for membership were considered; and the following names were approved for inserting in the next ballot list:

For the class of Member: Messrs. J. W. Bottomley (Engineer and Manager, Milnrow), George W. Ellis (Manager, Berkhampstead), and Harold Shewring (Engineer and Manager, Rochdale).

For the class of Associate Member: Messrs. John E. Akroyd (Assistant Manager, Great Western Railway Gas-Works, Swindon), Harold Galleway (Assistant Manager, Whitby), James Howard Goldsmith (Works Assistant, Sydenham Works of the South Suburban Gas Company), Reginald N. LeFevre (Assistant Distributing Engineer's Department, Gas Light and Coke Company), William B. Maitland (Works Superintendent, Malta), Joseph F. Smith (Senior Technical Assistant, Leamington), Rowland J. Williams (Assistant Engineer and Manager, Abertillery), and Stewart Lord Wright (Junior Assistant Engineer, Birkenhead).

For the class of Associate: Mr. Harold F. Benham (Assistant Engineer, Messrs. L. Askew & Sons).

The following were admitted as students of the Institution: Messrs. Philip T. Carpenter, of Sheerness; Frederick J. Dent, of Leeds; and John L. Watkins, of Tipton.

Officers and Council for election for the year 1926-27 were nominated as follows:

President.—Mr. John Wilkinson, O.B.E., of Nottingham.

Vice-President.—Mr. John W. McLusky, of Glasgow (Mr. H. D. Madden is the Vice-President remaining in office).

Ordinary Members of Council (for four vacancies).—Messrs. J. H. Canning, O.B.E. (Newport, Mon.); W. E. Caton, (Oxford); Dugald Currie (South Shields); G. S. Frith, J.P. (Runcorn); Philip G. G. Moon (Bournemouth); H. C. Smith (Tottenham); W. J. Smith (Bolton); Charles H. Webb (Stourbridge); and John Wilson (Motherwell).

Auditors.—Mr. S. Y. Shoubridge and Messrs. Wood Drew & Company.

Hon. Secretary.—Mr. W. E. Price.

It was reported that Mr. Francis C. Briggs, of Dudley, had been elected for the year 1926-27 District Member of Council to represent the Midland Association of Gas Engineers and Managers; Mr. Herbert Lees, of Hexham, the North of England Gas Managers' Association; and Mr. R. Robertson, of Bristol, the Southern Association of Gas Engineers and Managers.

In response to an invitation received for the representation of the Institution at the Antwerp International Gas Exhibition, Mr. Arthur F. P. Hayman and Mr. Charles S. Shapley were appointed.

The President and Mr. F. P. Tarratt were appointed as delegates of the Institution at the conference of the Institution of Public Lighting Engineers which is to be held at Newcastle-upon-Tyne on Sept. 14, 15, and 16.

The details of the arrangements for the annual meeting of the Institution, opening on Tuesday, June 8, were discussed and approved. It was agreed that the respective Presidents of the American, Belgian, Canadian, French, German, Italian, Norwegian, Swedish, and Swiss Gas Associations be nominated for election as Honorary Members.

An invitation from the German Association of Gas and Water Engineers to assist in the celebration of the centenary of the German gas industry at Berlin on Sept. 19 was accepted, the President-designate being nominated to represent the Institution.

The President made a statement as to the action taken by the gas industry with reference to the Electricity (Supply) Bill since he last reported, and the present position of the matter.

It was announced that a memorandum was being prepared for issue to the industry, indicating the main points of the report of the Joint Committee of the Institution, National Gas Council, and British Commercial Gas Association, on the subject of gas and electric cooking.

Statements referring to the work of the Education Advisory Committee and to that of the Wrought-Iron Tubing Committee were presented and discussed.

At the request of the National Gas Council arrangements were made for carrying out research work in connection with gas liquor effluents.

A communication from the National Gas Council on the question of the exhibition of films relating to the engineering features of the gas industry was further considered; and it was reported that by the courtesy of Mr. Shapley, of Leeds, and Messrs. West's Gas Improvement Company, it would be possible to obtain the use of such films.

BUILDING TRADES EXHIBITION AT OLYMPIA.

At noon last Wednesday there was opened at Olympia an exhibition which is promoted entirely in the interests of the building industry, and is regarded as the finest display of its kind which has up to the present been seen in London. Of the substantial grounds which exist for the holding of this view, readers who have not already done so will have an opportunity of satisfying themselves between now and the 28th inst., when the exhibition closes. The opening ceremony was performed by the Lord Mayor of London, who himself voiced the opinion that the present exhibition is better than any of its predecessors.

It was urged strongly by the Lord Mayor that there should be co-operation between the authorities and all connected with the building trades, in order to "get rid of the bugbear of the housing question" as soon as possible. No consideration of custom, or of the comparatively narrow interests of any section of the regular building trades, he added, should be allowed to stand in the way. On this subject, Sir Kingsley Wood, M.P., remarked that in the period between the close of the war and March 1 last the total number of new houses provided in this country had been 602,724—a really extraordinary record, which had been exceeded by no country in the world. Of the number named, no fewer than 374,418 had been erected by private enterprise. Everyone was grateful for the work that had been done by the local authorities; but there was no doubt, speaking generally, that the greatest assistance had been given by private enterprise. Last year there was constructed the largest number of houses that had ever been built in one year in this country. The number was 159,026, of which 126,936 were built by private enterprise. Speaking as Parliamentary Secretary to the Ministry of Health, Sir Kingsley Wood was able to assure his hearers that there are already thousands of people living perfectly satisfied and contented in houses built according to new methods of construction.

As bearing upon this last remark, it may be mentioned that this year the promoters of the exhibition have made a special effort to bring to the direct notice of the public alternative methods of house building; there being shown in close proximity houses built entirely of brick, concrete, and steel. The whole of the floor space of the main building and of the new hall is occupied by over 300 exhibitors, who make a display of everything likely to appeal to the architectural and engineering professions, as well as to builders and contractors. Apart from actual building materials, there is a good show of labour-saving devices for the home, of which gas-consuming appliances may be truly said to be the greatest. The promoters are offering a prize of £100, to be competed for by students in the United Kingdom associated with trade schools, for the best essay on the exhibition.

Gas in Small Houses.

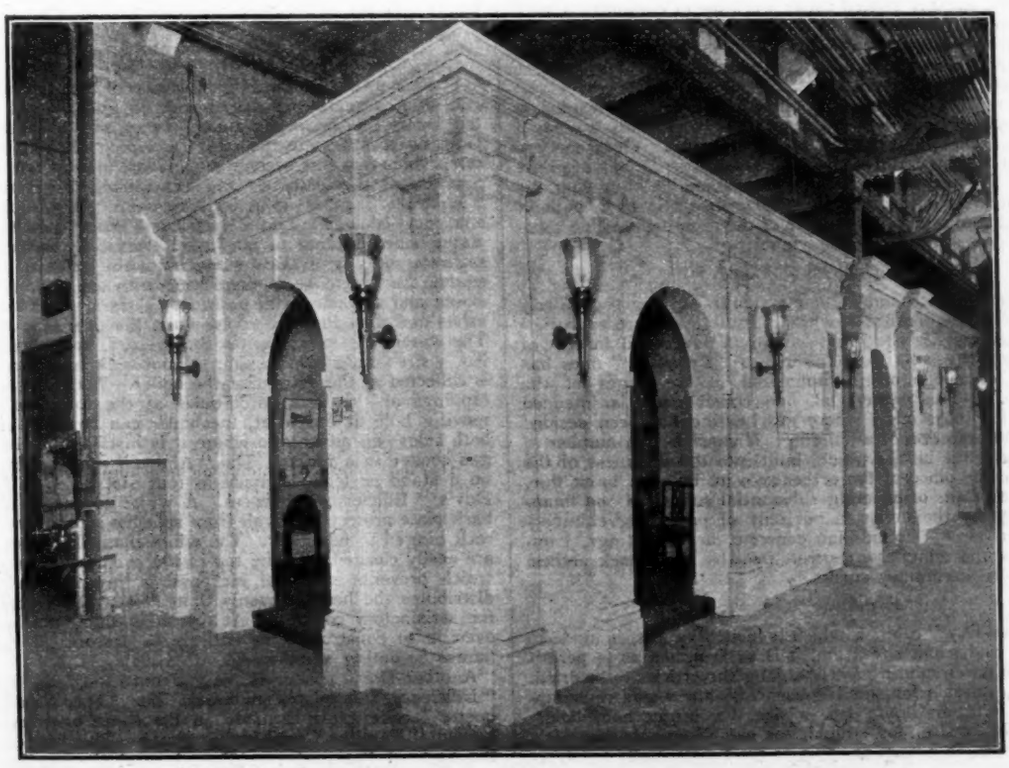
The steel house is of bungalow type, built by Messrs. Alexander Stephen & Sons, Ltd., of Glasgow, and consists of two bedrooms, living room, kitchen, and bathroom. It is stated that, on a mass construction basis, such houses can be erected for about £400 each. The builders' fittings are, of course, plain, but eminently serviceable; and gas plays an essential part in the scheme. In the bedrooms there are gas fires; while for the living room and the kitchen there is utilized a "Ure" back-to-back fire; the kitchen portion of which can be converted into a gas cooker in summer time when the fire is not alight. These grates have been supplied by the makers —Messrs. Allan Ure & Co., of Springbank Foundry, Keppoch-hill, Glasgow—for use in connection with many housing schemes. There are also in the kitchen a gas ring and a gas wash copper.

In the "Novocrete" house—another dwelling of the bungalow type, built by the Novocrete and Cement Products Company, Ltd., of Novocrete House, Buckingham Gate, S.W.—there is seen to excellent advantage one of the "Sentry" series of architectural gas fires, having the appearance of a grate filled with burning coal. These inset fires may be readily fitted to almost all types of coal grates. They are manufactured by Messrs. Wood, Russell, & Co., Ltd., of 34, Oxford Street, London, W., who have also on view in the same house the "Sentry" oven No. 0. This has been designed to work in conjunction with the "Sentry" Minor No. 0 hot water boiler, on base and legs. Extension hobs are fitted on the sides of the boiler hotplate, to increase the accommodation for utensils. The inside measurements of the "Sentry" oven No. 0 are 14 in. wide, 12 in. high, and 14 in. back to front. On the top of the oven is a large hotplate, upon which pots may be put to simmer; while for quick boiling the hotplate on the boiler itself (extending in front of the oven) is available. It is stated that cooking temperature in the oven can be readily obtained with any fuel of good quality; and that, if coke is ordinarily used for the hot water supply, when oven work requires to be done the addition of a few pieces of household coal will quickly raise the temperature of the oven to the required extent. Alternatively, any good quality patent fuel—such as Coalite or anthracite ovoids—is satisfactory both for hot water supply and for cooking.

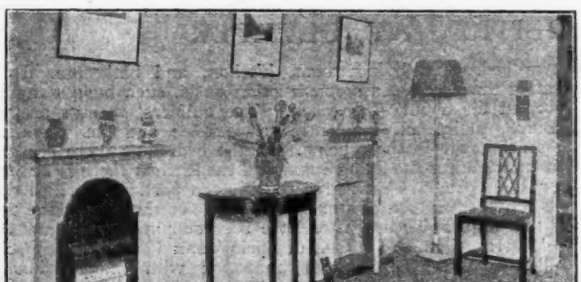
In different parts of the exhibition are various gas consuming appliances which it is unnecessary to enumerate here, intended for use in small houses or flats.

Gas Light and Coke Company.

A new-comer, whose appearance is heartily welcomed in so important a connection, is the Gas Light and Coke Company, whom we do not remember to have previously seen at the Building Trades Exhibition. In the New Hall, the Company have an attractive pavilion, which has already attracted a great deal of interest among architects who have visited it. The stand was designed by Mr. Walter Tapper, F.R.I.B.A., in a very simple and dignified style, and is largely devoted to



THE GAS LIGHT AND COKE COMPANY'S PAVILION AT THE BUILDING EXHIBITION.



Showing Hinged Gas Fires, to Demonstrate the "Economy" Flue.

Kitchen View, with "Eco-Dry" Cabinet on Right.

national housing purposes and a demonstration of "Economy" flue construction.

The system is admirably demonstrated here by means of gas fires hinged so as to open-out from the wall. There are Davis, Parkinson, Main, and John Wright fires so fitted—in some cases with the Nautilus "Economy" flue blocks fitted into the wall behind, and in another with the old-fashioned cavity in the wall. Fires are shown complete with mantel and raised hearth, of a pattern suitable for adoption in housing schemes. With the adoption of this raised hearth, it is unnecessary to put concrete in the floor beneath, as the device meets the usual building requirements.

The fires demonstrating the "Economy" flue are in one of the three rooms into which the pavilion is divided. In the centre room is a lovely Davis fire, in pewter finish, with a special stone mantelshelf and surround, designed by Mr. Tapper to form a harmonious whole. The third room is a kitchen, wherein is a recess containing a Radiation "New World Junior" cooker, with "Regulo" oven heat controller, and a No. 1 "Glow-Worm" boiler connected-up to a 40-gallon cylinder. There is a draw-off over a "Staines" teak sink having two compartments. Over the sink, also, is a Ewart "Brilliant" geyser. On one side is a Davis gas iron and a Cannon "Corna" gas copper; while on the other are an "Eco-Dry" cabinet and an "Electrolux" refrigerator.

The illumination of the stand, both inside and outside, affords an excellent example of the capabilities of gas from the lighting and decorative points of view. Outside there are eight Sugg "Flambeau" lights, with tulip pattern silk shades; while the main lighting of the interior is by Sugg "Bon Marché" lamps, with ventilating attachment, and Gas Light and Coke Company switch cocks working in conjunction with Sugg's distance control device. Tastefully designed brackets (operated by pneumatic switches) and an Evered floor lamp, with their choice silk shades, harmonize perfectly with the general scheme of decoration.

A feature of the centre room is a contrast of the results on the atmosphere of the use of gas and raw coal. This is secured by means of two illuminated scenic windows. Over one are the words: "The use of coal increases fog;" and over the other: "The use of gas increases sunshine." Altogether the Gas Light and Coke Company have a display which, both in design and equipment, must prove of the greatest possible value from the propaganda point of view.

"Economy" Flues.

The Nautilus "Economy" flue system is proving particularly interesting to the architects, who are more and more appreciating its usefulness. The great saving in space and in cost of building which results from the use of "Economy" flues has on many occasions been emphasized in the pages of the "Journal." This system of flue construction is intended primarily for those cases where gas heating has been decided on before the erection of a building. It consists of a number of cast concrete flue blocks which, built into the thickness of the walls, take the place of the orthodox 9 in. by 9 in. brick flue, and are the means of effecting substantial structural and financial savings by the omission not only of projecting chimney-breasts, but also of foundation concrete, brick footings, trimming joists and trimmers, concrete hearths, skew-back arches, and large brick chimney stacks.

"Eco-Dry" Cabinet.

The "Eco-Dry" cabinet, which is heated by gas, is made in both large and small sizes; and it is so designed as to permit of hot fresh air circulating freely among the articles to be dried. No. 1 size, suitable for small households, has a gas consumption of 20 c.ft. an hour; No. 2 size, for larger households, 30 c.ft.; No. 3 size, for still bigger establishments, 60 c.ft.; and No. 4 size, 80 c.ft. The cabinets are substantially constructed of welded wrought-iron framework, with sheet steel outer casing, and lined with asbestos composition. The latter is a non-conductor of heat, and presents a rustless surface to the interior. The exterior is finished in aluminium paint, with nickel plated fittings. A current of fresh warm air constantly passes through the cabinet, and the heavy and moist air is totally extracted from the inside, ensuring the uniform drying of all parts of the clothes at a minimum cost of heating medium. No moisture is depositted on windows, &c., where the apparatus is installed.

"Electrolux" Refrigerator.

An account of the "Electrolux" refrigerator appeared in the "Journal" for March 3 last (p. 534); but it may be repeated here that it works on the ammonia evaporation principle, and that it is claimed for it that it is the only known contrivance which will continuously produce cold without the use of any mechanical moving parts. The apparatus consists of three cylindrical iron vessels connected by iron pipes, charged with a certain quantity of distilled water, ammonia, and an inert gas such as hydrogen; the whole system of pipes and cylinders being welded together, and thus hermetically sealed, so that escape of the liquid or gaseous contents is impossible. Means are provided for applying heat—and this heat may be supplied by gas, equally as well as by any other method—to one of the cylinders; and a small quantity of water is allowed to flow over one of the other cylinders, and also round one of the connecting pipes. Cold is continuously produced in the third cylinder so long as the supply of heat and water is maintained. The apparatus is, in fact, of the utmost simplicity. The liquids and gases with which it is charged are used over and over again, and will last for many years. The household size (10 c.ft. inside capacity) requires only about 3 c.ft. of gas an hour; and this maintains an average temperature within the cabinet of 40° Fahr.

Davis Specialities.

Visitors to the Building Exhibitions—which are held at intervals of two years—are accustomed to find a good display by the Davis Gas Stove Company, Ltd.; and this occasion provides no exception to the rule. Again in the tiled kitchen recess, which has now become so popular, there is found the combination of a coke boiler and gas cooker. This time it is a "Nautilus" boiler side by side with an "Alpine" high efficiency cooker. The "Nautilus" coke heated domestic water boiler is made of mild steel electrically welded; and the separate rotating firebars which form the grate or fire bottom enable the fire to be clinkered-out with the door and the top closed and the ashpan in position. Thus there is no escape of ashes and dust into the room while the fire is being cleaned. The waterways extend below the firebars, and with No. 2 and No. 3 sizes under the ashpan, so that sediment from the water is collected at the bottom of the boiler. With flow and return tappings at the back, mud-holes at the top, and sludge-removing hole at the front, the boiler can be fitted close in on both sides—an advantage where it is installed by the side of a gas cooker in a recess. The "Alpine" gas cooker, which is on a stand or legs, is made in four sizes, and is fitted with Davis "Efficiency" burners. A white enamelled tile-pattern back plate protects the wall from splashes; and there is a plate rack hinged to fold back. The white enamelled sides and door are easily cleaned. At the top of the oven is an air controller, which prevents excess of air passing through the oven, and distributes the heat so evenly that all the shelves can be used for satisfactory cooking. At the same time, the base of the oven is so constructed as entirely to prevent all risk of the flames becoming smothered.

Another Davis cooker is the "Front-Line," on stand, with "Efficiency" hotplate, platerack, &c. The Nautilus "Coquette" coke grate is made on the same lines as the well-known "Nautilus" coal-saving grate. The flue outlet is at the back of the grate; so that, beyond the negligible minimum, no heat escapes by way of the flue. The canopy, once

heated, acts as a radiator, and retards combustion. The stove consists of a stout outer casing of cast iron, lined with best quality firebrick of high radiating power, with a cast-iron grid bottom, to which is fitted a shaker device operated by a square-ended bar passing through the base front, for periodical disturbance of the fire and removal of the ash, which falls into a concealed ashpan under the fire. The space between the vertical firebars and the lower edge of the canopy accommodates a movable blower with cast-iron framing and panels of wire gauze, and running inside grooves arranged with three definite position stops. Geysers are well represented by the "Clover," the "Rose," and the "Shamrock," while the Nautilus "Blighty" copper, a saver of time and money, illustrates "washing day made easy." The "Garba" portable heater long ago established a name for itself. Nautilus "Terrazzo" slabs are made of marble chippings embedded in cement, and are designed for protecting a kitchen floor where a gas cooker is located, or for the attractive display of cookers in gas showrooms.

Davis gas fires suitable for housing schemes are, of course, emphasized; and in the centre of the stand there is a beautiful example of a high-grade fire with beaten-metal surround and Nautilus chimney piece—the whole forming a unique combination. Davis "armoured" hand-made gas grates—*i.e.*, cast-iron frames covered with hand-beaten metal (copper or brass, or in pewter finish)—are in big demand for positions where a handsome appearance is sought.

"Victor" Gas Boilers.

There is a full display by Messrs. Thomas Potterton, of Cavendish Works, Ravenswood Road, Balham, London, S.W., of hot water appliances embodying the well-known "Victor" gas boilers with various forms of combined equipment to operate with solid fuel. There are on view a number of drawings showing details of larger installations for institutions, as well as examples of domestic equipment, which should prove of great interest to gas distribution staffs, architects, builders, &c. The stand is well lighted by bowl ceiling fittings and brackets (controlled by switches), provided by the South Metropolitan Gas Company.

As to the actual appliances on view, a "Victor-Combination" boiler for solid and gaseous fuel is fitted in conjunction with a Sugg "Chef" cooker, showing one of the most advantageous forms of equipment for the domestic kitchen. As an example of low-pressure water heating with circulating radiators, a No. 19 "Victor" gas boiler is fitted up as a complete installation, illustrating the efficiency and reliability of this arrangement for small heating requirements. The air thermostat employed gives most accurate results, and can be set to maintain any desired temperature in the space to be warmed. Other interesting examples of hot water equipment are to be found in two separate 921 "Victor" complete apparatus with rectangular storage. One of these sets is fitted upon the "push-out" system, supplying hot water to the sink with direct feed from the rising main, to meet the demand for small installations where a roof cistern does not exist. "H" and "D" series "Victor" boilers and complete apparatus with single and twin boiler units and proportionate storages are shown; and a useful alternative combination of coke and gas apparatus may be seen in the form of a "Domestikatum" boiler applied to a No. 921 "Victor" complete apparatus.

For premises requiring a series of radiators, there is the combination of an Ideal "Britannia" boiler and "Victor" complete apparatus, having calorifier. This arrangement provides for an ample hot water supply during the winter months, with the alternative of the gas boiler in the summer time when the larger coke boiler is unsuitable for the small requirement. This type of installation is being adopted very largely in some of the better-class houses, and forms an excellent outlet for the economical use of gas in conjunction with solid fuel in the form of coke.

Gas Burner for Lighting Coke Stoves.

A feature of Messrs. Potterton's stand is a new gas burner which is mainly intended for the lighting of domestic hot water coke stoves—though its use is by no means necessarily confined to this purpose. At the Building Exhibition the burner (for which provisional protection has been secured by Messrs. Alfred Harrison and Norman S. Smith, B.Sc.) is seen connected-up to a coke boiler; and though the stove is not filled with coke, the powerful character of the two gas jets which are brought to bear upon its interior holds out great promise of its efficiency in actual practice. Attached to a coke boiler or fitted as a separate unit at the side, such a burner should prove invaluable to the housewife, as constituting an ever-ready means of re-igniting the coke when the fire has died out accidentally or been allowed to do so for cleaning purposes. In the hot weather, too, the availability of a quick and easy means of re-lighting might afford a welcome alternative to keeping a stove going the twenty-four hours through. Another use which suggests itself for a burner of this character is to supply "just that little extra heat" which at times might be necessary to consume household refuse rapidly and entirely in a coke stove.

Both burner and connections are all-metal; and a swivel joint enables the gas ejectors (which when in use are positioned to eject through the spaces between the bars of the fire) to be turned away close-up to the side of the stove.

Geysers and Water Heaters.

The automatic heater manufactured by Messrs. Clarkhills, Ltd., of 27, Old Bond Street, London, W., can be seen working from a low head and also from the main—thus demonstrating the fact that it can be fitted to satisfy any local water regulations or conditions. The sizes exhibited range from 3 gallons to 5½ gallons a minute. The "Clarkhill" heater is designed to supply on demand all the hot water necessary for a house or flat, without utilizing a hot water tank, &c. The opening of any draw-off tap lights the main gas burner, which is turned down to a by-pass light when the draw-off is closed. The operating valve is all metal.

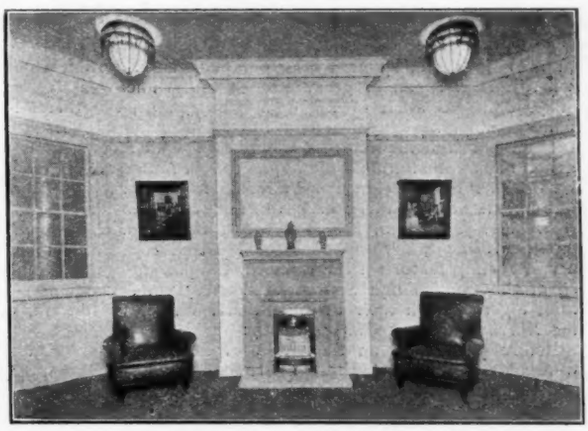
A wide range of water heaters exhibited by Messrs. Ewart & Son, Ltd., of Euston Road, London, N.W. (many of them in action), include the "Lightning" geyser, standard pattern, for bath and domestic use, and "Califonts" giving an instant hot water service to both lavatory basin and sink.

The speciality of Express Boilers, Ltd., of 65, Great Portland Street, London, W., is a copper water heater with a two-way tap. The consumption of gas is put at 1 c.ft. a minute; and the capacity at 1½ gallons a minute at 110° Fahr., or 3 pints of boiling water a minute after 17 seconds.

Messrs. Fenlon & Son, of 8, Tudor Street, London, E.C., show large and small geysers of various patterns, together with the "C. C. Fleet" combination circulator and storage at work, and garage and greenhouse heaters.

There is a selection of geysers made by Messrs. Howard & Hill, Ltd., of 61, Theobald's Road, London, W.C.

Gas heated geysers, cylinders, and furnaces, for supplying hot water under various conditions, are made by the "Hurry" Water Heater Company, of 39, Broad Street, Birmingham.



The Centre Room, with examples of Efficient Lighting and Heating.

Barralet's geysers are the result of forty years' experience in the manufacture of such appliances, and are made by New Geysers, Ltd., of 200, City Road, London, E.C., who emphasize the "Two-Way" and "Reliafont" patterns. The former is to supply (say) a sink and bath, while the latter will provide hot water to any number of taps throughout a house. Easy cleaning *in situ* is secured by the patented "access base;" and New Geysers also manufacture Barker's patent air inlet valve, which is constructed on scientific principles.

The Pollard Engineering Company, Ltd., of 128, Shaftesbury Avenue, London, W., have a geyser, which is made in two sizes, with an output of 1½ gallons and 2½ gallons respectively. Simplicity, safety, and economy are claimed for it. The working principle is that the cold water, after flowing up an outer jacket, falls by gravity over a number of trays, and flows out through the spout at the bottom.

Messrs. Rigby & Mellor, of Britannia Works, Bury, Lancs., draw attention to their household gas boilers, which are made in several styles. Of this series of "Britannia" boilers, they say that the gas fumes and the steam generated in the boiler have a common and positive outlet. "By means of a mid-feather and projection between the outer casing and the boiler, these two exhausts are not allowed to combine until taken clear of the top; and the effect of the combination at this point results in the complete evaporation of the water properties contained in the steam by the hot dry fumes from the gas."

Well-known coke water heaters and stoves—such as the "Domestikatum," "Esse," "Falco," "Glow-Worm," "Hydresse," "Nautilus," and "Sentry," are distributed throughout the exhibition.

Miscellaneous Exhibits.

Painting is an important part of the work of the builder and decorator; and the Aerograph Company, Ltd., of 43, Holborn Viaduct, London, E.C., show complete portable plants for the purpose, for use by one or more operators.

Bell's Poilite and Everite Company, Ltd., of Southwark

Street, London, S.E., show an "Everite" flue attached to a Potterton "Victor" gas boiler. From the point of view of cost, "Everite" is said to show a very great economy as compared with cast metal.

The Expanded Metal Company, Ltd., of York Mansion, Petty France, Westminster, S.W., who are engineers for all forms of reinforced concrete work, have an exhibit consisting of samples of their products and examples of their uses, as well as photographs of various works carried out on their systems. One of their specialities—"Expamet" expanded steel—has been in successful and ever-increasing use all over the world for more than thirty years, as reinforcement for concrete in foundations, walls, floors, roofs, bridges, &c.

The "Smoothtop" gas range is again exhibited by the Falkirk Iron Company, Ltd., of Falkirk, who point out that in this type of cooker every square inch of the top is cooking surface; there are no cold spots. The food is cooked over the burners; and, when ready, vessels can be slid over the polished heat-retaining top to a position where they will simmer or boil until the food is required to be served. The same firm's "Falco" coke boiler is made in four sizes for use with storages of from 25-30 gallons up to 45-55 gallons.

Another tiled recess is to be seen on the stand of Messrs. Jones & Attwood, Ltd., of Stourbridge—this time containing a "Domestikatum" hot water supply boiler side by side with a Sugg "Chef" cooker. The latest patterns of the "Domestikatum" include several new and improved features.

There are many artistic tiled and other fireplaces—including the Burmantofts "Lefco" terra-cotta patterns, of which a display is made by the Leeds Fireclay Company, Ltd., of Wortley, Leeds.

Useful paints and preservatives are manufactured by the Mond Tar Bye-Products Syndicate, Ltd., of 47, Victoria Street, London, S.W. "Melanoid" colloidal bituminous paints, made by an entirely new process, as the result of years of research at one of the Mond laboratories, provide a lasting protection to all forms of metal and wood work; and "Zulite" is a new wood preservative emanating from the same laboratories, for which are claimed fungicidal efficiency, power of penetration, and durability.

The efficiency of "Permac" is demonstrated by Messrs. Thomas & Bishop, Ltd., of 37, Tabernacle Street, London, E.C., by means of a series of joints—including flanges, screwed piping, &c. Water at a pressure of 250 lbs. per sq. in. is employed, and joints are broken and re-made, to prove the claim that no time is necessary for setting when "Permac" is used. A working model shows various types of lubricators utilizing the firm's "Flexo" grease, which is manufactured in nine densities; and attention is drawn to their oil reclaiming plant and refractory cements for boilers.

MIDLAND JUNIOR GAS ASSOCIATION.

Visit to the Old Kent Road Works of the South Metropolitan Gas Company.

On Saturday last, April 17, many members of the Association availed themselves of the opportunity of visiting the works of the South Metropolitan Gas Company at Old Kent Road, where an afternoon of great interest and value was enjoyed. Inspection was made of the carbonizing plant, the meter repairing shop, the chemical and the physical laboratories, and the industrial demonstration laboratory, which constitutes a general exhibit of industrial appliances, furnaces, &c., which have either been designed and erected to meet the special requirements of consumers, or have been submitted for examination. Mr. J. H. Gee, B.Sc., of the Birmingham Gas Department, President, accompanied the Midland Association; and an interesting feature of the visit was the presence of the Council of the London and Southern District Junior Gas Association, together with their President, Mr. W. L. Westbrook, of the North Middlesex Gas Company.

Before proceeding on their tour of inspection, the visitors were addressed briefly by Mr. Albert Stokes, who is Gas Supply and Stores Manager of the South Metropolitan Company, on the general features of gas service in the Company's district.

Carbonizing Plant.

Retort houses Nos. 7, 8, 9, and 10 were first examined. Each house contains 160 retorts in settings of ten, and between each house is a coal store with a capacity of 1750 tons. As for the retorts, these are 20 ft. long and of oval cross-section (21 in. by 15 in. inside dimensions). The gas connections are divided into units of four settings, each unit being separately equipped with a governor for vacuum control. When discharging and charging operations are in progress, the particular unit is for the time being worked under a reduced vacuum. Immediately the retort doors are closed, the vacuum is restored to the normal. The weights on the governor bells are readily operated from the stage floor by means of a wire cable.

The retorts in Nos. 7, 8, and 9 houses are charged by machines of the West "scoop" type, operated by compressed air at 70 lbs. per sq. in. pressure; while Arrol Foulis machines hydraulically operated at 650 lbs. per sq. in., are employed in No. 10 house. The hot coke from the retorts is discharged by a Hunter Barnett hydraulic pusher, known as the "Co-Partner," which is the standard machine used at all the Company's works.

Gas for heating the settings is generated in producers situated outside the retort houses. There are two to each house; and when fully charged, each generator contains approximately 40 tons of coke. They are charged at intervals of two hours from overhead storage hoppers, each having a capacity of 25 tons. The coke supplied to each producer averages about 17 tons per 24 hours. The calorific value of the producer gas is approximately 120 B.Th.U. (gross) per c.ft., and the analysis averages 29 p.ct. of carbon monoxide, 4 p.ct. of carbon dioxide, and 8 p.ct. of hydrogen. The waste gas contains an average of 19 p.ct. of carbon dioxide, and 0·5 p.ct. of oxygen. Before leaving the setting, it passes through regenerators, and imparts heat to the incoming gas and secondary air. The combustion chamber temperatures are maintained as near as possible at 1300° C.

Coke Handling Plant.

The hot coke from the retorts is carefully lowered by special portable inclined chutes, in which it is partially quenched, into hoppers, where the quenching operation is completed. When drained, the coke is lowered into trucks, which are drawn out of the retort house by an endless wire rope (driven by gas engines), and finally tipped on the store heaps in the adjacent yard. A large proportion of the coke made is broken and elevated into concrete hoppers, from which vehicles may be loaded quickly and economically. The waste material from the producer furnaces is dealt with in a breeze washing plant, by which it is sorted into different grades of coke and clinker.

Average Makes of Gas and Products.

(10-*hour Carbonization.*)

Retort Houses Nos.	7.	8.	9.	10.
Weight per charge (cwt.)	10·5	10·5	10·5	11·5
Coal carbonized per 24 hours (tons)	200	200	200	220
Make of gas, therms	14,250	14,250	14,250	15,620
Make of gas per ton of coal carbonized	—	—	72 therms	
Make of gas per retort	—	—	90 ,,	
Total gas made per 24 hours	—	—	58,370 ,,	
Total coal carbonized per 24 hours	—	—	—	820 tons
Standard calorific value of gas	560 B.Th.U. per c.ft.			
Specific gravity	0·420			

Products.

Coke made for sale per ton of coal carbonized	10·5 cwt.
Tar ,, ,, ,, ,, ,, ,,	10·5 gals.
Liquor (8 oz. strength) ,, ,, ,,	42·0 ,,

(or the equivalent of 28 lbs. of sulphate of ammonia).

Condensers.

The gas is drawn from the retort houses by four exhausters driven by compound condensing engines of the "Farey" type. It is then passed through four sets of "Carpenter" reversible water-cooled condensers. Each set consists of twelve 24-in. diameter vertical pipes, 24 ft. long, coupled at top and bottom alternately. Each limb is tubed with sixteen 2-in. diameter pipes, terminating in top and bottom chambers which are bridged to form a continuous passage-way for the water. The gas travels in the opposite direction to the water, and is cooled to within 1° Fahr. of the temperature of the incoming water. While traversing the condenser, the gas comes into contact with tar, which is sprayed into the top of each limb.

With this method of working, the trouble usually experienced with stoppages due to the deposition of naphthalene is completely eliminated. The efficiency of this plant is emphasized when it is stated that no main between the washers and holders has had to be cleared of naphthalene for the past ten years.

Purification.

After leaving the condensers, the gas is passed through a series of three Livesey washers, of which there are two sets. These are effective in removing the last traces of tar from the gas, and a large proportion of the ammonia present. The gas is then passed through tower scrubbers for the final elimination of the ammonia, when it enters the purifiers. There are three sets of these, each set consisting of four primary and two secondary boxes. These are approximately 40 ft. by 25 ft. by 4 ft. 4 in. deep, and have a capacity of 70 to 80 tons of hydrated oxide of iron when laid in three tiers, on wooden grids. Interposed between the primary and secondary boxes is the

plant for the further reduction of the sulphur compounds by the nickel catalyst process.

METERS AND HOLDERS.

From the purifiers the gas passes to the station meters, three in all, each having a capacity of 1120 therms per hour, the drums of which work in concrete tanks sunk in the ground. The final purification is by the "Holmes" rotary type horizontal washers, containing anthracene oil, by means of which the small quantity of naphthalene remaining in the gas is completely eliminated. From the washers it enters the holders, the total storage capacity of which at this works is 64,400 therms (560 B.Th.U. gas).

The gas made at Old Kent Road is not sufficient to supply this part of the Company's district, and therefore additional gas is pumped from the East Greenwich Works, through about four miles of 48-in. main, by centrifugal fans.

The works has its own fitters', blacksmiths', and carpenters' shops, also shops for cleaning and repairing gas fires, stoves, meters, lamps, fittings, &c.

In the meter shops general admiration was expressed of the wonderful system of ventilation, and particular interest was exhibited in a new therm prepayment meter—an invention of Dr. Carpenter—the change wheel of which is divided in fractions of a penny, each cog of the wheel representing a farthing. The mechanism is set, of course, to register in therms gas of a calorific value of 560 B.Th.U., the declared standard to which the Company are at present working; but in the event of a change in the declared value, the mechanism can be adjusted simply and quickly.

CENTRAL CHEMICAL LABORATORY.

The visitors then passed on to inspect the central chemical laboratory, where all manner of highly interesting exhibits were on view. It is not possible here to detail all these exhibits, which evoked the praise of the visitors. However, mention may be made of a few. There was an apparatus for carrying out trial carbonizations for determining the effect of temperature, rate of heating, physical nature of coal, &c., upon the yield and nature of products obtained. Specimens of coke and tar obtained in this apparatus showed the effect of different rates of carbonization; other specimens of coke demonstrated the effect of blending different materials with the coal for the purpose of avoiding expansion. Great interest was displayed in a demonstration dealing with the corrosion of iron in water. It was shown that, whereas sodium chloride stimulates corrosion, chromates have an inhibitory effect. The visitors passed on to examine an apparatus for determining volatile matter in coal under conditions more precise than those laid down in the so-called American test. Another extremely interesting item was an apparatus for determining the reactivity of cokes, which was explained by Mr. E. V. Evans, the Chief Chemist of the Company.

PHYSICAL LABORATORY.

As the majority of the visitors were interested more particularly in the distribution side of the gas industry, considerable time was spent in the physical laboratory, the burner workshop, and the industrial section. The first thing to be examined in the physical laboratory was the photometer room. The photometer bench was shown equipped for the measurement of the radial distribution of illumination from a street lamp in which reflection is utilized to effect concentration of light in directions approaching the horizontal. Demonstration of the difference in the light emitted by an ordinary mantle and by a "daylight" mantle attracted much attention. The determination of the intensity of various parts of the spectrum of a "daylight" mantle, by means of a Hilger Nutting spectrophotometer (described on p. 163 of this issue of the "JOURNAL"), was shown.

Other exhibits included a comparison of noises made by various gas jets and burners, and the measurement of air induction by gas jets. Of particular interest was a high-pressure gas governor. In this, a constant pressure is maintained within a cylindrical chamber, closed on one side by a diaphragm. Any variation of pressure occurring on the outer side of the diaphragm opens or closes a paraboloidal valve, whereby constancy of pressure is maintained at the outlet from the governor. The device can be employed to construct governors operating at either high or low pressures, and was shown working at a pressure of about 15 lbs. per sq. in., this pressure being maintained constant at an orifice through which air at this pressure is discharged, while the supply pressure varies from about 20 to 70 lbs. per sq. in.

BURNER WORKSHOP.

In the burner workshop the visitors were able to see the production of ejector discs. Orifices of standard dimensions are produced in discs of nickel alloy. To ensure smooth passages for the efflux of gas, the discs are burnished by hand. They are then mounted in seatings cut in the disc-holder, and are spun, to make sure that no leak can occur between holder and ejector disc. The orifices are tested to ensure that the jet of issuing gas will be directed axially down the burner tube. For this purpose a jet of gas issuing from the ejector orifice is ignited, and the ejector rotated about its axis. Any departure of the stream of gas from an axial direction is clearly seen. A system of limit gauging for the standardization of all component parts was demonstrated. These standardized parts are assembled into a burner which is examined for symmetry, alignment, &c. The assembled burners are placed on a bar supplied with gas at a pressure of 25-tenths water-column, and each burner is lit for a period of half-an-hour, and the character of the flame in each burner examined. Burners exhibiting defective flames are rejected. The consumption of each burner is determined to ascertain that it falls between specified limits. A similar procedure of standardization is applied to the production and assembling of gas fires, and street lighting, high-pressure, and cluster burners.

The final item in the tour of inspection was the industrial section. In this the visitors were able to examine muffle and crucible furnaces, fish-frying ranges, apparatus for the manufacture of confectionery, and various types of industrial burners.

THANKS TO THE COMPANY.

Thereafter the party assembled in the Staff Dining Hall, where tea was provided. Mr. E. V. Evans presided; and among those at his table were Mr. Gee, Mr. Westbrook, and Dr. E. W. Smith.

Mr. GEE said that all would agree that the visit, which had been a very important event for the Midland Juniors, had been thoroughly enjoyed. It was the Association's first visit to a London works since the war. That afternoon they had been privileged to follow in the footsteps of the Institution of Gas Engineers, who had inspected the laboratories last June. What the Association had seen had constituted an object lesson of scientific gas manufacture; they had been able to appreciate the ceaseless vigilance and meticulous care exercised by the Company in all phases of their work. It was evident that neither expense nor effort was spared to ensure accurate scientific control of carbonization; and the quality of the gas which was sent out on to the district was not allowed to vary from the declared calorific value. And who, asked Mr. Gee, could place a value on the satisfaction of the consumers which such an admirable system of working ensured? This, of course, was only a typical example of the thoroughness that marked every phase of the Company's operations. He would like to express his appreciation of the presence of the President and members of Council of the London and Southern District Junior Gas Association. This was a friendly act which demonstrated that the Junior movement was national in character. All present were greatly indebted to the South Metropolitan Gas Company.

Mr. C. F. TOOBY, Senior Vice-President of the Midland Association, proposed a vote of thanks to Dr. Carpenter and the Directors of the Company, and to all those of the staff who had helped to make the visit of the Association such an outstanding success. He would mention in particular Mr. Evans, Mr. Stokes, Mr. F. A. Frost, and Dr. Thomas. All the visitors would carry away with them a vivid impression of the scientific methods of the South Metropolitan Company.

Dr. C. M. WALTERS, of the Industrial Research Laboratories of the Birmingham Gas Department, seconded the vote. As one who was primarily interested in the application of gas to industry, he appreciated the advantages of a supply of gas of constant chemical and physical properties. He had been impressed by the low figure for unaccounted-for gas in the Company's area, and this was doubtless due to the care exercised in fitting work, examination of screw threads, &c. They had been able to see many interesting examples of industrial furnaces; and the Company were to be congratulated on the design of their low-pressure furnaces worked on the recuperator principle.

Mr. WESTBROOK, on behalf of the London Juniors, thanked the President, Directors, and staff of the South Metropolitan Company for giving the London Juniors the opportunity of meeting their friends from the Midlands. Everything the Company did was carried out in a most thorough manner. The Company was a tower of strength to the gas industry throughout the country, and, indeed, throughout the world.

Mr. EVANS, replying, said that Dr. Carpenter had been pleased to receive the Midland Junior Association's request that they might visit the Company's works—a pleasure which had been increased by the request that the President and Council of the London and Southern District Junior Gas Association should be allowed to meet their friends from the Midlands. Mr. Evans said he was sure that Dr. Carpenter, had he been able to be present that day, would have been delighted to hear the appreciations which had been expressed of the inspection of the works and laboratories. The visit had been arranged to appeal particularly to those engaged on the distribution side of the industry, who formed, he understood, the majority of the members of the Midland Junior Association. There was a saying to the effect that 60 p.ct. of the profits of any gas undertaking were made or lost in the retort house. Although this was substantially true, the position as regards controlling the carbonizing process was very different from the days when this epigram was first framed. In those days carbonization was in every sense of the word an art, but he suggested that to-day the process was better understood and could be subjected to definite control. It was now easy, or comparatively easy, to remedy troubles in the retort house. What had to be watched to-day with the greatest care was the efficiency of service to the gas consumers; and it was at this end of the business that one might say now that 60 p.ct. of the profits of the gas undertaking were made or lost. Mr. Evans hoped that those present would leave with the impression that the South Metropolitan Gas Company were doing their best to ensure the satisfaction of their consumers.

Mr. FROST, Manager of the Old Kent Road Works, and a former President of the London and Southern District Juniors, also replied briefly to the vote of thanks.

NOTES ON NEW BOOKS.

MODERN DRYING MACHINERY.*

This book gives an easily-assimilated account of modern drying machinery, and will meet the needs of those who wish to gain a purely general idea of drying operations.

* "Modern Drying Machinery," by H. B. Cronshaw, B.A., Ph.D., A.I.C., A.R.S.M. Published by Ernest Benn, Ltd.; price, 6s. net. (Chemical Engineering Library—Second Series.)

MATERIALS TESTING.*

The authors of this book have dealt with general principles rather than specific items; and they state in their preface that the volume should be treated as a text to accompany a laboratory course in the study of materials under stress, rather than a laboratory handbook in the commonly accepted significance of the term. The aim throughout has been to indicate basic methods of attack and interpretation, and not to outline in detail any particular set of tests and experiments. Whether a course in the testing of materials be short or long, its investigations should be based on the study of the fundamental stresses or strains, and methods for their determination. The methods commonly employed in the study of tension, compression, torsion (shear), bending, hardness, shock, &c., are detailed; and the book also gives an account of the characteristic phenomena evinced by iron (wrought and cast), steels (carbon and alloy, annealed, heat-treated, and overstrained), wood, brick, cement, and concrete. The volume is clearly written, and the printing is excellent.

* "Materials Testing," by Irving H. Cowdrey and Ralph G. Adams. Published in America by John Wiley & Sons, Inc., and in England by Chapman & Hall, Ltd.; price, 7s. 6d. net.

SELF-INSTRUCTION FOR STUDENTS IN GAS SUPPLY (ELEMENTARY).*

The method adopted by the author in writing this volume is the simple one of asking and answering a series of questions. That this system is appreciated by the student is proved by the popularity of the work, for it is the Fourth Edition which is before us. We are glad to notice that the writer, in his introduction, states that "he does not desire to assist in anything in the nature of a 'cramming' operation. Before attempting to answer any of the questions, the student should read up the subject and the treatises recommended." If the student adopts this plan, and works conscientiously through the whole of the questions and answers, there is no doubt that he will acquire a useful knowledge of the elementary principles of gas supply, and have no need to fear the ordeal of the examination room. Certainly we recommend the book without hesitation. It is divided into thirteen chapters dealing with pressures and governors, discharge through pipes, soldering, jointing, and protecting valves and cocks, mainlaying, service laying and meter fixing, meters, interior fitting, burners and reflectors, flame, lighting, domestic uses other than lighting, and industrial uses.

* "Self-Instruction for Students in Gas Supply (Elementary)," by "Mentor." Published by Ernest Benn, Ltd.; price, 10s. 6d. net.

SELF-INSTRUCTION FOR STUDENTS IN GAS SUPPLY (ADVANCED).*

The Third Edition of this well-known book by "Mentor" has been published. It is a continuation and extension of "Self-Instruction in Gas Supply (Elementary)," and is intended for the use of students preparing for the Higher Grade Certificate of the Institution of Gas Engineers, and for the Diploma Examination. The method adopted in writing this volume is the same as that used in the elementary work; the questions numbering 216. Adopting "Mentor's" method, we ask the following query—No. 217: A glance at any of the questions enables the student to grasp readily the import of the subsequent answer. In the more advanced work, does this ease tend to detract from the student's appreciation of the general applicability of the matter contained in the answer; or, in other words, does it tend to stimulate or decrease his thinking powers and his critical faculty? Answer to this query must necessarily be the expression of an individual opinion, so we will refrain from any dogmatism, and pass on to an indication of the contents of the book. The volume is divided into 27 chapters, dealing in turn with the following subjects: Theory and practice of flow of gas in mains, mains and services, pressure recorders, high-pressure distribution toxic effects of various gases, calorimetry, photometry, the incandescent mantle, low and high pressure interior lighting, public lighting, theory and practice of heating, ventilation and hygiene of gas, gas engines and pumps, industrial uses of gas, gas in competition for heat, light, and power, physical laws, and legislation affecting gas supply. For the most part, the questions are very much to the point, and the answers are pithy and satisfactory. It is thought, however, that the treatment of flame temperature leaves a good deal to be desired, and may be misleading; that it would be preferable to have used the thermal basis rather than the volumetric one in comparing costs of power generation by gas and electricity (nowadays the term "1000 c.ft. of town gas" is very vague); and that, in the latter comparison, the figure taken for the cost of town gas—viz., 1s. per 1000 c.ft.—is one which denotes an extraordinary optimism. As we have stated, the volume is intended for the student preparing for the Diploma. In view of this, the bright little answer given to question 95—"What do you understand by a 'low-grade' gas? Why may such a gas be more advantageous for modern purposes than a 'high-grade' gas?"—seems somewhat superficial. It is as follows: "By a low-grade gas is commonly understood one with a lower calorific value than generally obtains with present-day town gas (400 to 500 B.Th.U. per c.ft. gross)—say, 150 to 200 B.Th.U. gross. Such a gas could be produced much more cheaply than the ordinary town gas, and its lower cost would more than compensate for its lower calorific value, when consumed in cookers, engines, &c. When used for producing light by means of a mantle, its efficiency might be equal to, if not greater than, that of the present gas, at a much reduced cost, because the great reduction in the percentage of the constituents giving illumination when consumed in an open flame would lead to a large reduction in the air required for combustion, and quite high flame temperatures could be obtained." In making these few criticisms, however, we only desire to suggest points which the author could perhaps improve upon in future editions of what is undoubtedly a book of definite value to the student of gas supply.

* "Self-Instruction for Students in Gas Supply (Advanced)," by "Mentor." Third Edition. Published by Ernest Benn, Ltd.; price, 10s. 6d. net.

INTRODUCTION TO MECHANICS.*

This book is intended for beginners who seek to include a knowledge of mechanics in a foundation for the study of science or engineering. Its scope corresponds roughly to the attainments expected of candidates for preliminary scientific and technical examinations, such as the Matriculation or Intermediate examinations of most English universities. In other words, it covers as much of the theory of mechanics as it is expedient to learn without a knowledge of the calculus. The volume is divided into two sections, dealing respectively with statics and dynamics. The first part commences with a consideration of the triangle of forces; the theory being developed from the force and the couple. This treatment enables attention to be paid quickly to the reduction of any system of coplanar forces. There is an excellent chapter on work; and the first section concludes with a brief chapter on machines. The book proceeds largely as a sequence of carefully chosen examples. In Part II., attention is concentrated, over the first half, on rectilinear motion. Great emphasis is given to energy and momentum; and simple harmonic motion, which is introduced earlier than is the common practice, has been treated strictly as a form of rectilinear motion. Curvilinear motion, dealt with *ab initio*, leads to a complete proof of the mechanical part of the principle of work and energy. A chapter on relative motion concludes the volume, which can be heartily recommended for its thoroughness. The author has treated his subject in an original and convincing manner.

* "An Introduction to Mechanics," by J. P. Clatworthy, B.Sc. Published by Methuen & Co., Ltd.; price, 8s. 6d. net.

INORGANIC CHEMISTRY.*

This text book, which covers the ground in inorganic chemistry necessary for the School Certificate and Higher Certificate Examinations, and for Oxford and Cambridge Local Examinations, is not encumbered with tedious descriptions of apparatus and methods of fixing them. While the treatment in the earlier portion of the volume is sufficiently elementary to be readily understood by a young student, sufficient matter is afforded for a four years' course in an ordinary secondary school. A short epitome of important events in the history of chemistry is included. The work has been brought up to date by the inclusion of the new method of manufacturing nitric acid, contact processes for the production of sulphuric acid, and the various electrolytic processes.

* "Outlines of Inorganic Chemistry," by J. Morris, M.A. Published by Methuen & Co., Ltd.; price, 7s. 6d. net.

PHOTOTOPOGRAPHY.*

In this book the author outlines the essential principles of the photographic method of surveying, which is now being widely employed on the Continent and in America. Quite wrongly the art of phototopography is too commonly regarded in this country as being either an innovation or an experiment outside the sphere of orthodox surveying; and comparatively little English literature has been contributed on the subject. Consequently this little volume helps to fill a decided need. The text presupposes a knowledge of surveying and levelling, and so waives explanation of common field phrases, terms, and definitions. The fundamentals of photogrammetry are older than photography itself, being the converse principles of perspective, as enunciated presumably in the seventeenth century. The uses of the photographic method are, briefly, engineering, topographical, geographical, and geological surveys, and

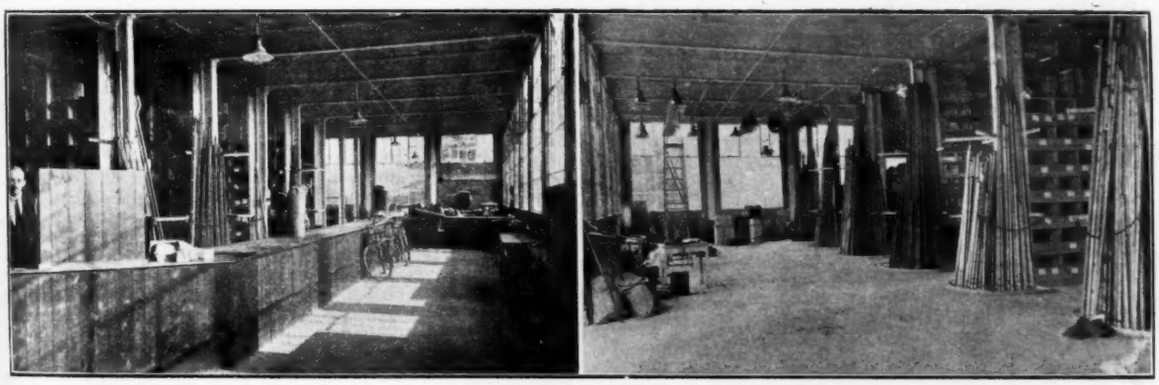
meteorological observations. A great advantage, and one peculiar to the method, is that field work at any station may be completed in a relatively short time, and that everything seen from the stations is permanently recorded by the photographs. On the other hand, the reduction of time in the occupying of stations is at the expense of office work; the process of interpreting and plotting from the photographs being at best very tedious. The accuracy attainable in photographic surveys is a strained point in its comparison with that of other methods, and should be assessed by the fitness of the method. For reconnaissance work, the photographic system is more economical than any other. The chief advantage, however, is in its amenability to conditions under which other methods would fail or be inexpedient. It is thus invaluable in mountainous regions. Phototopography has certainly many limitations, and can be but an accessory in constructural projects; though, on the other hand, it is unsurpassed in exploratory work and in extensive and difficult topographical surveys. The book is written in an interesting manner.

* "Phototopography," by A. L. Higgins, M.Sc., A.R.C.S., Assoc.M.Inst. C.E. Published by the Cambridge University Press; price, 6s. net.

LONDON JUNIORS AT FINCHLEY.

PHOTOGRAPHS taken during the visit of the London and Southern District Junior Gas Association to the Works, Showrooms, and District Stores of the North Middlesex Gas Company on April 10. [An account of the visit was published in last week's "JOURNAL."]

OUTSIDE THE NEW DISTRICT STORES.



TWO VIEWS OF THE INTERIOR OF THE STORES.

Helps v. Oldham Corporation.—The case of Helps *v.* Oldham Corporation was again in the list for last Thursday, but was deferred for a fortnight. Probably this means that endeavours are being made to arrive at a settlement.

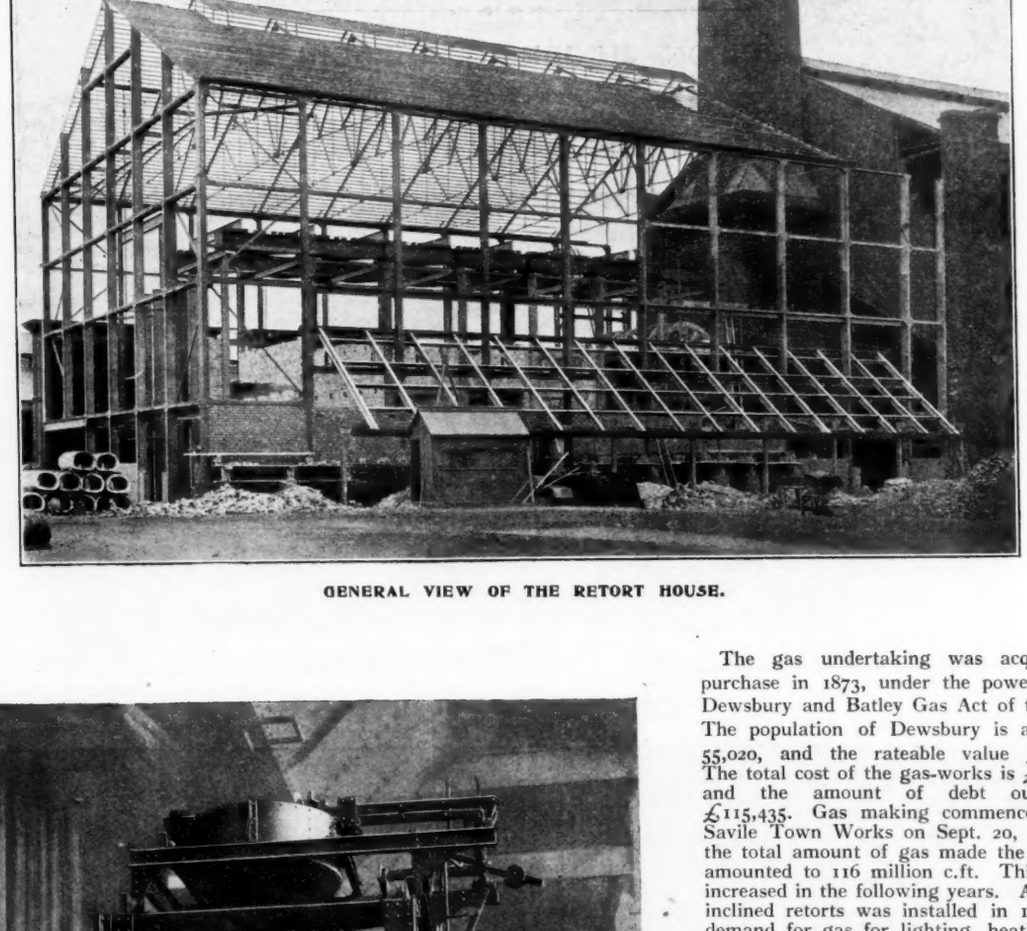
All-Arc Welded Holder in the United States.—What is believed to be the first all-arc welded gasholder to be built in the United States was constructed during last year at Lexington (Mo.) by the Western Gas Construction Company, of Fort Wayne. It is a small holder, and has been illustrated in the pages of the "Gas Age-Record." The bottom plates and the two upper courses of side plates are $\frac{7}{16}$ in. thick. The first side course is $\frac{1}{4}$-in. plate; and the gas container and crown are of No. 10 gauge material. All seams are lapwelded. The bottom and side seams have $\frac{3}{4}$-in. laps; the bottom seams being welded with a continuous fillet on one side, while the side seams have a continuous fillet on one side and tack welds on the other. The side seams of the container are joined on both sides with a continuous weld; and the seams on the crown are welded on one side only.

Burning-Out Pipe Joints.—Mr. Walton Forstall, of the U.G.I. Company, quoting, in the "American Gas Association Monthly," experience at the Philadelphia Gas-Works, says that, when burning-out joints, the joints must be free from all dirt. The reason for this is that, as soon as the acetylene flame comes in contact with dirt, it melts it, and forms a glassy coating; and this, in turn, on cooling, contracts and flies off, endangering the unprotected parts of the man doing the burning, or other persons near. Another lesson gained by this work is that when the pipe is laid horizontally, the burner should start burning the joint at the top, forcing the molten lead out of the joint, and causing it to run-down the sides of the pipe. If the operation is started at the bottom, the acetylene flame does not heat the lead to such a degree that it will retain its liquid form for a sufficient interval of time for it to flow or run out of the joint; but it cuts the lead, and the pressure of the flame forces it to flow. The lead almost immediately coöls in contact with the cooler pipe, as it runs around the pipe in the joint space from the top towards the bottom; and it is found to harden in the lower part of the joint.

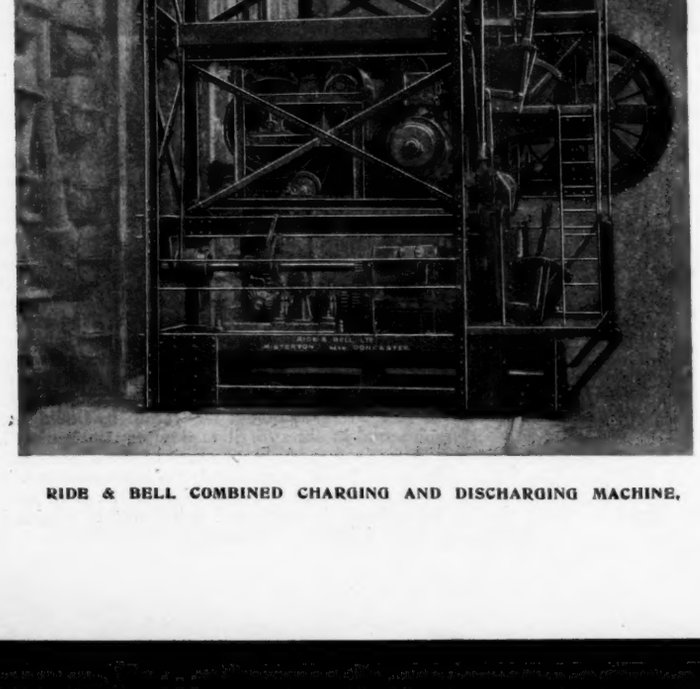
HORIZONTAL RETORT INSTALLATION FOR DEWSBURY.

DETAILS OF NEW PLANT AT THE CORPORATION GAS-WORKS, SAVILE TOWN.

[From a Brochure prepared for the Official Opening on April 19. Gas Engineer and Manager, Mr. Henry L. Bateman.]



GENERAL VIEW OF THE RETORT HOUSE.



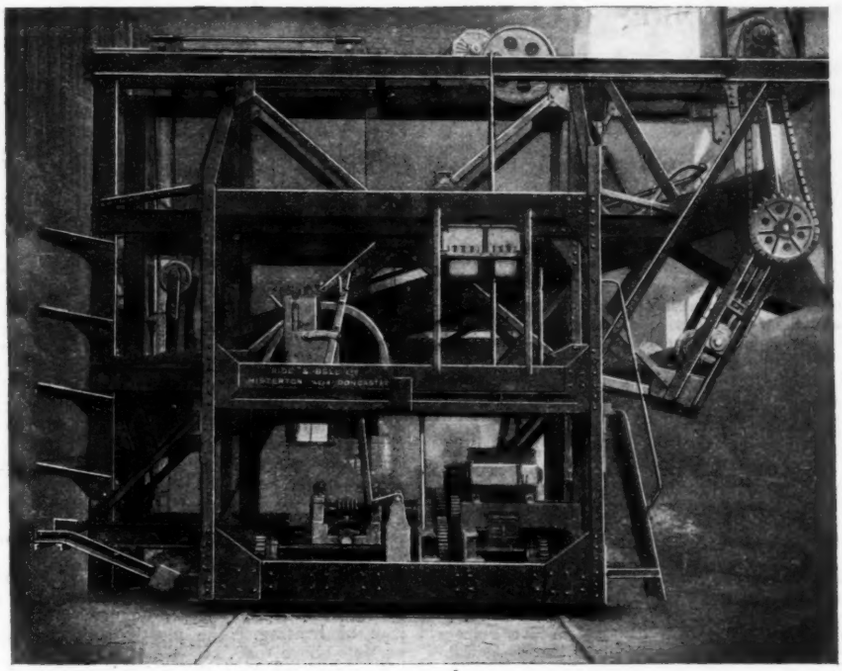
RIDE & BELL COMBINED CHARGING AND DISCHARGING MACHINE.

The gas undertaking was acquired by purchase in 1873, under the powers of the Dewsbury and Batley Gas Act of that year. The population of Dewsbury is at present 55,020, and the rateable value £305,545. The total cost of the gas-works is £280,350; and the amount of debt outstanding £115,435. Gas making commenced at the Savile Town Works on Sept. 20, 1876, and the total amount of gas made the first year amounted to 116 million c.ft. This steadily increased in the following years. A bench of inclined retorts was installed in 1897. The demand for gas for lighting, heating, cooking, and power steadily increases; and during the past year approximately 300 million c.ft. were made.

Owing to the rapid and continuous increase in demand, the need for modernizing and enlarging the manufacturing plant on up-to-date principles could no longer be delayed; and in the autumn of 1924, after very careful consideration, it was decided to demolish the old retort house containing five beds of seven hand-charged retorts, and to erect on the same site a horizontal retort installation consisting of seven beds of ten retorts each, 23 ft. long; mechanical stoking machine; coke machine and quenching bench; coal conveying, breaking, elevating, and storage plant; gas-driven electrical generators of 60 kw. capacity; together with a new steel and brick retort house. The specification and plans for the new works and plant were prepared by the Gas Engineer and Manager (Mr. H. L. Bateman), and the contract was entrusted to Messrs. Gibbons Bros., Ltd., of Dibdale Works, Dudley.

New Retort House.

Built on the site of the old horizontal retort house, the new retort house consists of a steel-framed structure 70 ft. 6 in. span by 105 ft. long by 44 ft. high from ground level to eaves. The structure is filled-in with brickwork on the two sides and one gable end; the other gable end butts-up to the existing



RIDE & BELL HOT COKE HANDLING MACHINE.

inclined house. The roof principals from the old retort house were thoroughly overhauled and renewed where necessary, and refixed on top of the new structure. The roof and ventilator are covered with slates secured to wood battens fixed to angle-iron purlins.

Retort House Plant.

This consists of a bench of seven arches; each arch being filled-in with a Gibbons & Masters latest tube regenerator and furnace, and a setting of ten 24 in. by 18 in. special ⌂ section retorts 23 ft. long, five tiers high. The main flue is connected to the existing chimney by means of a special up-take. The bench is complete with all bench bracings, retort mountings on each side of the beds, with separate hydraulic mains to each bed, foul mains, retort house governor, and tar mains, together with four tar towers. The stage floors, 12 ft. high, are formed of rolled steel joists and channels filled-in with concrete and paved with hard Staffordshire blue bricks.

Coal Handling Plant.

Coal is brought to the works on the overhead siding, and is discharged into a coal receiving hopper fixed immediately underneath the existing railway gantry. From the receiving hopper, the coal is fed to a band conveyor by means of a reciprocating feeder, which ensures a regular supply to the breaker. The band conveyor is 107 ft. centres, and is housed in a covered-in trench. The band conveyor delivers the coal into the receiving hopper over the breaker, which is fitted with a screen to by-pass the small coal.

The breaker is of the four-roll type, fitted with heavy flywheel. The coal breaker pit and drive end of the band conveyor are enclosed in a steel structure covered with corrugated iron. From the breaker, the coal passes to the inclined elevator and to a conveyor of the drag-bar type, which distributes it into the main overhead coal storage hoppers, holding about 36 hours' supply. The conveyors, elevator, breaker, and reciprocating feeder are driven by totally enclosed motors made by the Electric Construction Company, of Wolverhampton.

Combined Retort Charging and Discharging Machine.

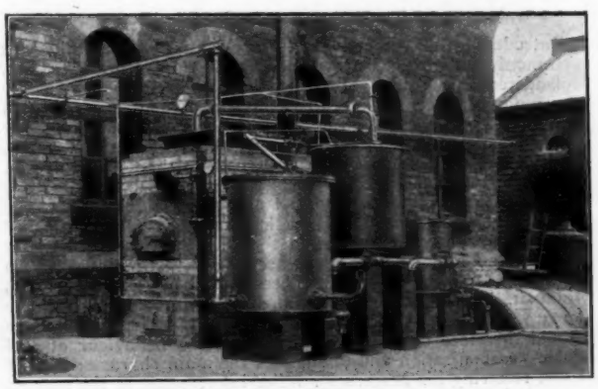
The combined retort charging and discharging machine is of the projector type, supplied and erected by Messrs. Ride & Bell, Ltd., of Misterton. It is electrically driven throughout, having separate motors for charging, travelling, and hoisting.

Coke Handling Plant.

The coke handling plant consists of a Ride & Bell patent hot coke handling machine, which takes the coke from any of the five tiers of retorts, and deposits it through openings in the retort house wall on to a quenching bench running alongside the house. This bench is a strong steel structure filled-in with concrete and paved with hard Staffordshire blue bricks. Special gates are provided at the lower end, to discharge direct by gravity into carts or railway wagons. A gantry is fixed along the front of the quenching bench to operate the gates, and also to facilitate the quenching of the coke. The latter is done by means of special sprays.

Gas-Driven Electricity Generating Plant.

This consists of two "National" V.E. type horizontal single cylinder engines, each capable of developing 45 B.H.P. as a constant working load, and 50 B.H.P. maximum for half-an-hour when running at 230 R.P.M. These engines drive, by means of chain gear, two enclosed ventilated compound wound interpole dynamos, each 30 KW. 220 volts, running at 725 R.P.M., made by the Electric Construction Company. The plant is complete with a main switchboard to control the two 30 KW. dynamos in parallel, together with five circuit feeder panel, complete with all the necessary instruments for controlling the sets. This plant is fixed in a new generator house which has been built at one end of the existing coal store.



"T.I.C." TAR DEHYDRATION PLANT.

"T.I.C." Tar Dehydration Plant.

A "T.I.C." tar dehydration plant (which operates on a most up-to-date and original principle) was installed for the purpose of manufacturing first-class road tar, as required for the surfacing of the roads in the County Borough of Dewsbury.

Society of British Gas Industries.—The annual meeting of the Society will be held at the Hotel Cecil on Wednesday, May 5—the Right Hon. Sir Alfred Mond, Bart., M.P., in the chair. We learn from the Secretary (Mr. Arthur L. Griffith) that the general business will be taken at 2.30, and that the President will deliver his address at 3.30. In the evening the members will dine together.

SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).

The Annual General Meeting of the members was held in the Cadoro Restaurant, Glasgow, on Saturday, April 10, when Mr. Robert Gray, of Hamilton (the President), presided over a large attendance.

The Hon. Secretary and Treasurer (Mr. John Murray, of Glasgow) submitted the annual report of the Council, and the accounts, which showed that on April 9 the Association had practically £70 in hand. The report, which was unanimously adopted, included the following:

Mr. Jas. Brown, late of Glasgow and now of Sheffield, has been awarded the first prize for the papers read during last session, and will receive the prize so generously presented by Mr. Charles Ferns. Mr. Jas. Graham, of Kilmarnock, has been awarded second place, and receives the Association prize. The Council desire to thank Messrs. D. Fulton, J. Lang, and J. Dickson, the Adjudicators, for their work on behalf of the Association.

In conjunction with our colleagues of the Eastern District, a number of special meetings were held in Edinburgh, Glasgow, and Stirling to discuss the difficulties in connection with the students obtaining suitable classes to enable them to sit for the examinations of the Institution of Gas Engineers. On an early date it is hoped to address a letter to all members inviting them to give particulars of the classes and courses they desire, so that, in conjunction with the Advisory Committee of the North British Association of Gas Managers, definite information may be given to the students as to how and where they can obtain this training. Every endeavour will be made to set up classes at various centres in our area. It is hoped that all junior members of the industry will co-operate with the Association by giving the necessary information.

The Council recommend that a further donation of five guineas be made to the Education Scheme through the North British Association of Gas Managers.

Congratulations are due to the following members on their promotion: Mr. W. Phairns (Dalmarnock), to Assistant Manager, Troon; Mr. J. Blair (Saltcoats), to Manager, Dingwall; Mr. J. Brown (Glasgow), to Assistant Industrial Superintendent, Sheffield; Mr. Noel Smith (Greenock), to Superintendent, Luton; Mr. J. Simpson (Greenock), to Technical Representative, Messrs. Woodall, Duckham; Mr. G. Hannah (Kilmarnock), to Assistant Manager, Dunoon.

The following office bearers were then appointed for next session:

President.—Mr. James Hall, Provan Works, Glasgow.
Vice-President.—Mr. James Graham, Kilmarnock.
Hon. Sec. and Treasurer.—Mr. John Murray, Gas Office, Glasgow.
Members of Council.—Messrs. Jas. Jamieson, Helensburgh; David Garrie, Tradeston, Glasgow; Duncan Melvin, Uddingston; John Boyle, Greenock; and A. Shand, Greenock.
Auditors.—Messrs. M. E. Collier and C. Gill, Glasgow.

COKE, ITS PRODUCTION AND CHARACTERISTICS.

By Prof. T. Gray, of the Royal Technical College, Glasgow.

[Abstracted.]

Introducing his subject, Prof. Gray remarked that coke was commonly regarded as a bye-product of gas manufacture, but, considered as a source of potential heat energy, it was really the main product. It constituted 60 to 70 p.ct. by weight of the total products; and the amount available for sale, after having satisfied the internal requirements of the gas-works, usually represented more than 50 p.ct. of the original heat energy of the coal used. It was obviously the duty of the gas manager to supply this potential energy in a serviceable and readily available form; and the lecturer, therefore, welcomed the steadily growing interest in the production and properties of coke—an interest which had been greatly stimulated by the admirable essays which had been published in the "Gas Journal." It was evidently impossible to deal, in a single lecture, with the wide range of subjects there discussed. He would therefore confine his attention to the behaviour of coal during carbonization and to some of the main characteristics of coke, referring his hearers for fuller information to the sources indicated.

Dr. Gray then referred to the banded structure of coal, and stated that vitrain and clarain, which together form the bright coal, soften under the influence of heat, and form a coherent coke, while the durain or dull coal is feebly coking or non-coking, and the soft powdery fusain, which occurs in relatively small proportion, is entirely non-coking. The presence of a large proportion of fusain has a detrimental effect on the coking qualities of a coal. In consequence of the heterogeneous character of coal, the formation of a uniform coke is greatly facilitated by grinding.

Regarding the individual constituents of coal, practically nothing is known. Treatment with solvents generally results in the removal of a negligible proportion of the coal substance. A notable exception is pyridine, which extracts from certain coals—particularly from coking varieties—varying proportions, amounting to as much as 20 p.ct.; and the residue is either very feebly coking or entirely non-coking. The pyridine extract has been proved to be partly soluble in chloroform; and the terms alpha, beta, and gamma compounds are now generally employed to distinguish, respectively, the portions of the coal (1) insoluble in pyridine, (2) soluble in pyridine but insoluble in chloroform, and (3) soluble in pyridine and in chloroform. The coking properties of coal are commonly ascribed to the presence of gamma-compounds, though this conclusion is not universally accepted, as definite proof that the action of pyridine is purely a solvent one is still lacking.

Prof. Gray dealt shortly with the sequence of formation of the main products of distillation of coal, and subsequently with the formation of coke, as follows:

Oils, or liquids other than water, first appear at a temperature between 300° and 350° C. and their evolution probably ceases in most cases below 500° C. Rapid evolution of gas begins in the neighbourhood of 350° C. The gas formed below 450° C. contains a large proportion of the gaseous paraffins methane, ethane, propane, and butane, with a relatively small proportion of hydrogen. The evolution of the members of the paraffin series practically ceases above 700°, and between 700° and 800° there is a marked increase of the quantity of hydrogen evolved. The rapid evolution of hydrogen continues with bituminous coals till 900° C. has been reached, and subsequently falls off; but gas is still slowly liberated at temperatures above 1000° C.

Formation of Coke.

Coking coals soften and become plastic when heated.

Foxwell gives the range of temperature over which coking coals are plastic as 370° to 500° C., and finds no indication of plasticity below 370° C. He states that the temperature of commencement is sharply defined, and is independent of the rate of heating. The plastic condition in exceptional cases persists above 500°.

Sperr states that the softening-point of medium and high volatile coking coals lies between 350° and 370° C., while that of low volatile coking coals may be as high as 415° C., and of poorly coking high-oxygen coals 370° to 390° C. He states also that the plastic state extends over a range of 50° to 60° C.

Audibert reports the softening-point between 325° and 450° C. and the temperature of active decomposition 375° to 500° C. He finds that the rate of heating affects the softening-point. During experiments with eight samples of coking coal, softening occurred (when samples were rapidly heated) at temperatures varying from 10° to 50° C. below those obtained with the same coals when the temperature was raised at the rate of 1° per minute; thus proving that chemical changes were taking place, without, however, causing any appreciable loss of weight. ["Revue de l'Industrie Minérale," March, 1926, p. 115.]

When the temperature of the coal is raised further, active decomposition occurs within the plastic range; and the gases, escaping through the viscous material, convert it into a spongy mass. It is evident that the degree of swelling, depending upon the rate of heating, when the limit of the plastic range has been reached, will determine the porosity and general form of the coke.

The solid coke at this stage is soft and friable. Further heating causes the material which composes the walls of the pores, originally formed by the inflation of the plastic mass, to undergo decomposition, with the evolution of gas; and a progressive shrinkage and hardening takes place.

The resulting coke, produced at a high temperature, is a more or less porous mass composed of vitreous carbon, and according to Beilby it "is possessed of a spongy cell structure which under suitable conditions may have a minute porosity which is not only comparable with that of wood charcoal, but may far exceed it. . . . It is like a black glass, almost opaque and entirely without metallic reflection. With lenses of low resolving power the reflections from the surfaces of the more minute bubbles or cells give the effect of scattering, but on examination with the 16 mm. lens it is seen that the surface of the minute bubbles is glass-like."

Effect of Rate of Heating.

A high rate of heating causes excessive swelling, due to the rapid expulsion of the gas from the viscous mass, and results in the formation of coke possessing large pores with thin walls and relatively low strength. In practice, the slow rate of heat transmission through the coke during the carbonization of masses of coal, and the restriction imposed by the walls of the oven or retort, prevent excessive swelling. Another method of achieving this result, which has been successfully practised at H.M. Research Station, by Sutcliffe and Evans, and others, is the blending of the fusible coal with a less fusible coal or with coke or anthracite. Carbonization of a properly adjusted mixture proceeds without foaming, and produces a harder, more easily combustible coke, which occupies a smaller volume than the original coal.

While high rates of heating tend to cause excessive swelling when applied to strongly coking coals, the effect on feebly coking coals is beneficial. The practice of coking in narrow ovens with high flue temperatures (1400° C.) has been prevalent in the United States for many years, and has more recently been adopted in this country. Coals which give partially fused masses in the existing wider ovens with flue temperatures of 1100°, yield well-fused, serviceable metallurgical coke in the more modern narrow oven. The coke is obtained in smaller

pieces; and, as a result of the shorter coking period—viz., 16 compared with 30 hours—it is more easily combustible. Mixtures of feebly coking coals with a relatively small proportion of high-class coking coal have also been successfully used.

In this connection the experiments of Audibert have a special interest. Using a modified form apparatus devised by Charpy and Durand for the determination of the softening points of coals, Audibert has determined the softening points, and the temperatures at which rapid decomposition with appreciable loss of weight begins, under varying slow rates of heating ranging from 0·5° to 3° C. per minute, and also at high rates. He has also carried out a microscopic examination of small coal cylinders, which had been subjected to heat treatment and subsequently quenched in water. From the results of his experiments, he draws the following conclusions:

(1) The swelling is caused by the development within the coal of a large number of very small bubbles of gas.

(2) Between the temperature at which rapid decomposition begins and a higher temperature, Ts, which appears in all cases to be below 600° C., the apparent increase of volume is an increasing function of the temperature of rapid heating. The maximum value, heating to a temperature equal to or above Ts, generally exceeds 100 p.ct., and it reaches, with some coals, 400 p.ct.

(3) A coal rapidly heated to a temperature about Ts, and cooled, is rendered incapable of fusing.

In order to deprive a coal of its power to fuse, it is not necessary to raise its temperature to Ts, or even to the point of active decomposition. It is sufficient to maintain it at a temperature between the softening and decomposition points for a period which decreases with increasing temperature. This period for twelve coals maintained at an arbitrarily chosen temperature, below the decomposition point, was found to vary, according to the nature of the coal, from ¼ to over 100 hours.

Attention has already been called to the observations that rapid heating gives a melting point lower than the figure determined by raising the temperature at the rate of 1° C. per minute, thus proving decomposition occurs in the neighbourhood of the softening point, and that this change does not involve any sensible loss of weight in the case of a coking coal.

Audibert divides the bituminous coals examined by him into two classes:

Class I.—Coals which have softening points below the temperatures at which they undergo rapid decomposition, accompanied by sensible loss of weight.

Class II.—Coals which, when slowly heated, decompose at temperatures below their softening points.

Coals of Class I., to which the good coking coals obviously belong, fuse, forming a homogeneous liquid phase, as is evident from a microscopic inspection of a section prepared from the coal which has been rapidly cooled while in the plastic state. If the plastic coal is further heated, the formation of a uniform coke proceeds normally in the manner already described.

Coals of Class II., when slowly heated, decompose and undergo loss of weight at temperatures below their softening points, with formation of products of progressively increasing melting point. A microscopic examination of the rapidly cooled coal discloses a heterogeneous mass of irregular polygonal particles with a tendency to rounding of the angles if the final temperature was high. If the coal is heated rapidly to the same temperature, the softening point is reached before the relatively slow decomposition has progressed sufficiently to affect the composition of the fusible constituents to a serious extent. These then fuse and dissolve the coal substance, forming a homogeneous mixture from which a uniform coke is formed on further heating. A section of the coal after rapid heating to the required temperature and sudden cooling appeared quite homogeneous, thus proving that the coal substance and the products of decomposition had mixed homogeneously with the fusible constituents.

Further observations by Audibert on the fusion of mixtures showed that the addition of relatively small percentages of certain coals of Class I. to coals of Class II. gave mixtures which fused completely when heated at the rate of 0·5° to 1° C. per minute; and several examples are quoted. These interesting experiments shed additional light on the process of coke formation.

The published records of H.M. Fuel Research Station, the results of the experiments of Sutcliffe and Evans, and the later developments which have taken place in the coke industry, leave no room for doubt that the manufacture of a serviceable coke, which will be sufficiently reactive to burn in an open domestic fire, by carbonizing selected coals or suitably blended mixtures, in horizontal or vertical gas retorts, is feasible practically. Provided that the period of carbonization is shortened so as to avoid the complete exhaustion of the material, it should be possible to discharge a coke which will yield sufficient volatile matter to ensure easy ignition, and which will possess the necessary combustibility. It rests with the gas engineer to decide whether the greater ease of disposal of the coke will compensate for the decrease of the yield of gas.

Methods of Testing the Coking Value of Coal.

Coking Index.—Campredon sand test modified by Gray.

Agglutinating Value.—Sinnatt and Grounds.

Both measure the power of cementing inert particles. The first specifies sharp sand, and the second ground electrode carbon—both of specified sizes. The tests do not provide information regarding the strength and value of the coke produced; but they measure the capacity of the coal to form a compact coke when mixed with the addition of non-coking or feebly coking coals. They serve a useful purpose for the selection of suitable coals for coke making, and indicate the varieties which are likely to prove serviceable. The ultimate test of their suitability must be carried out under working conditions in the coke oven or retort. Experience of the modified Campredon test has shown that coals having a coking index of 16 and over give serviceable coke in the older form of bye-product oven. In the vertical gas retort, coals with an index between 10 and 15 are likely to prove suitable.

Valuable information regarding the suitability of coals for coke manufacture may be derived from a study of their behaviour when carbonized under varying temperature conditions, either alone or in admixture with other coals, or with inert material, in the laboratory apparatus designed by Lessing or by Gray and King.

Characteristics of Coke.

In view of the limited time at his disposal, Dr. Gray confined his remarks on this section of his subject to a discussion of the qualities required by the domestic user. He adopted the specification of Dr. Davidson,* and suggested the addition to this of the further requirement that the volatile matter should not be less than 5 p.ct. In this connection, he stated that the official methods of the Fuel Research Board Coal Analysis Committee were applicable to coke, with the exception of the method of determining volatile matter. To avoid loss of weight, caused by oxidation of the finely powdered coke, he recommended that the coke should be weighed in a porcelain or silica boat, and that this should be placed in a silica tube and heated in a current of nitrogen. He subsequently discussed the qualities of the coke in the following terms.

A suitably graded gas coke may be burned successfully in practically any type of domestic fire, provided a sufficient depth of fuel is maintained. The least suitable type is the well-fire, on account of the tendency of the banked-up coke to slide forward on to the hearth. The most suitable form is the closed or partially closed stove. The ideal open fire should be as high as is practicable, and relatively shallow from front to back. Such a fire presents to the room the maximum radiating surface, and has a radiant efficiency which exceeds that of a coal fire. The provision of a movable iron blower to restrict the open space above the fire, thus directing the air current towards the fuel, is desirable, though not necessary.

The main objections to the gas coke at present available are (1) the difficulty of ignition, and (2) the large percentage of ash. The first objection is not a serious one if a gas supply is fitted to the hearth; but such an arrangement is seldom available. The difficulty of ignition is due to the presence of an excessive proportion of water, which must be driven-off by evaporation during the process of lighting the fire, and to the highly vitrified character of the carbonaceous matter, caused by the long-continued heating in the retort. This objection may be removed to a large extent by the exercise of greater care in quenching the coke, or by the adoption of the method of cooling the coke in closed chambers, and by avoiding the excessive exhaustion of the coke during carbonization.

The main obstacle in the way of the extension of the use of coke as a domestic fuel is its high ash content, which frequently amounts to 15 p.ct. Apart from the loss of efficiency, due to unburnt carbon enclosed in the ash, the greater labour of cleaning the fire and removing ashes, and the larger quantity of dust discharged into the room, are considerations which determine the choice of household coal and anthracite in preference to coke. The use of screened coal for carbonization mitigates this evil; but the only satisfactory solution of the difficulty will be found in the employment of coal cleaned, preferably, by a dry process, since the large proportion of water remaining in washed coal adds seriously to the cost of carriage, and lengthens the period of carbonization. The duty to supply such a cleaned coal lies obviously with the colliery owners, as the cost of carriage and the labour of handling useless material will be saved by treating the coal at the mines.

Regarding the relation of the structure of coke to its combustibility, or reactivity, there is a conflict of opinion; and the discussion has largely centred round porosity. By definition, porosity is the ratio of the volume of the pores to the total volume of the coke, expressed as a percentage; and this is deduced from the experimental values of the real and apparent densities in the well-known manner. Porosity has an influence only when the air or gas is free to pass through the pores; and it then acts only by providing an increased surface. But the porosity as defined is not a measure of the reacting surface, even if the assumption is made that the gas passes freely through the mass, as the following consideration will show.

*"Gas Journal" Coke Number, p. 41.

Suppose a cubical box to be constructed with perforated sides 1 ft. long and of such a thickness that the internal volume, added to that of the perforations, is 0·6 c.ft., the "porosity" of such a block will evidently be $0·6 \times 100 = 60$ p.ct. If a thin slice is cut from the inside of each of the six sides, these six slices will together have a superficial area equal to twice that of the original box inside, and somewhat less than the total original surface area, inside and outside. Suppose the thin slips to be fixed inside the box at regular intervals, the free space will then be the same as that of the original box. In other words, the "porosity" remains unchanged, but the exposed surface will be nearly doubled.

By repeating this procedure sufficiently often, a cellular structure may be built-up which will have the original porosity but many times the original surface, and the reactivity will be proportionately increased. The maximum surface is presented by material which possesses the largest number of pores in the unit of volume. It is evident, however, that a limit is placed to the effectiveness of the surface of the pores in the interior by the resistance offered to the passage of gas through the narrow channels; and, considering the small difference of pressure available between the lower and upper surfaces of a piece of coke which is undergoing combustion, it is improbable that any considerable proportion of the total air passes through the pieces of coke.

If this conclusion is accepted, the effective surface will depend on the size of the pieces and on the method of packing, as the bulk of the air passes round and between the pieces, and the rate of combustion will be increased by decreasing the size, provided that the resistance of the fuel bed is sufficiently low to permit the passage of the required volume of air. Assuming a minute degree of penetration, a coke pitted with minute pores, surrounded by thin walls, will present a larger surface than one with a large-pored structure.

Other qualities which may influence the rate of combustion are the physical properties and the chemical composition of the carbonaceous matter. A dense, highly vitrified, coke may be expected to react more slowly than one which has been more moderately heated; and determinations of the weights of carefully sized coke, burned by passing a regulated current of air through the mass, seem to confirm this conclusion.

The presence of volatile matter will increase the ease of ignition, as the heat generated by the burning gases helps to raise the temperature of the mass of coke; and it probably contributes to some extent to the combustibility in the upper zone of the fire. Coke which yields a considerable proportion of volatile matter has obviously not been subjected to long-continued heat at high temperatures. It is therefore less highly vitrified and more easily combustible.

The lecturer expressed regret that the time at his disposal did not permit him to do more than refer to the large amount of experimental work on reactivity which has been carried out during the last few years.

A cordial vote of thanks was accorded Dr. Gray for his instructive address.

The members then adjourned for tea; and during an interval in the subsequent social proceedings, the prize given by Mr. Charles Ferns for the best submitted paper was presented to Mr. J. Brown, of Sheffield, for his contribution on "Industrial Problems;" and the Association's prize, to Mr. J. Graham, of Kilmarnock, for his paper on "Distribution Topics."

Mr. McIsaac was called upon to present the retiring President with his medal; and in accepting this Mr. Gray expressed his appreciation of the honour conferred on him in asking him to occupy the Presidential Chair.

At the invitation of the Town Council, the members will pay a visit to the Ardrossan Gas-Works on May 22, to inspect the water gas plant recently installed there. It will be recalled that one of the Western Juniors was recently appointed Engineer and Manager at Ardrossan; and the members are looking forward with interest to seeing the work of Mr. Sturrock.

OPTICAL CONVENTION.

Interesting Display at the Imperial College of Science and Technology.

Britain to the Fore.

It may not be generally known that this country was among the first to introduce and develop the manufacture of optical glass. Of recent years the justifiable reputation of foreign competitors somewhat overshadowed that of our home producers. However, the abnormal demand for war-time munitions enabled our manufacturers to develop and improve their technique; and it is now agreed that the quality of British optical glass is second to none. Modern scientific instruments—among them, of course, those used in the laboratories of gas undertakings—demand not only a high quality but also a large variety of glass to satisfy their requirements. That both variety and quality are available was demonstrated at the Optical Convention held from April 12 to 17 at the Imperial College of Science and Technology, South Kensington.

Declaring the Convention open, the Prime Minister said it often struck him that few people realized the extent their daily life was directed and facilitated by various branches of science. It might be that a hedonist would say, "Let me have the luxuries of life, and I will dispense with the necessities." But probably the hedonist little realized that without the microscope, polarimeter, and refractometer, he would get no beer fit to drink. And, we would remark in this respect, what is true of beer is true of gas; for without the numerous scientific instruments depending on the science of optics and the manufacture of reliable glass, by the aid of which it is possible to ensure that a supply of gas of constant quality and pressure is passed to the consumer, the gas industry would be unable to progress as it is doing.

Wide Appeal of the Convention.

The Convention—the first to be held since 1912—was excellently organized, and illustrated in an admirable manner the developments which have taken place in optical science and manufacture during the last fourteen years. Each day papers dealing with some phase of the wide subject of optics were read. It is intended in this short article to mention a few of the exhibits of particular interest to readers of the "Journal." Before doing so, however, it is desirable to indicate, by reference to a few of the general features, the scope of the exhibition, and how great was its appeal to the public. For example, the value of ultra-violet light in analysis was demonstrated. Most objects subjected to intense ultra-violet light become luminous in the dark. Hence, by this means, genuine precious stones may be distinguished from imitations. It is interesting to note that during the war ultra-violet light found a new application in the detection of "invisible" writing. Then there was the "Optophone," an invention of Dr. E. E. Fournier d'Albe, which enables a blind person to read any ordinary printed book or newspaper. The question of colour received special attention. It may be news to learn that a third colour is being introduced for "distant" signals by British railway companies. It was found difficult to produce a glass with a colour distinguishable from red and green and also from any stray white or yellowish lights which might be seen from the footplate. After years of research, a suitable glass was produced. Its colour is a moderate deep orange, which in foggy weather tends to approach the appearance of the red signal, so that there is no possibility of its being mistaken for the green. Instruments which have been evolved for dealing with colour problems were exhibited. The effective illusion signs for advertising work, exhibited by Theodore Brown, attracted a good deal of attention. One of these showed a fountain playing in the centre of a room, with lettering appearing and disappearing in the air. Mr. Brown also showed a "Spirograph"—a cinematograph film in the form of a gramophone record. This film can be seen in daylight, or can be projected on to a screen in the usual way. Two highly successful talking films, specially taken for the Convention, were shown.

Wealth is an Illusion.

Instruction and amusement—an unusual combination—went hand-in-hand at the Convention. In the Fairies' Theatre, of which the stage opening was about 16 in. by 12 in., fairy actors, less than 6 in. high, gave performances of two plays arranged by the Royal Academy of Dramatic Art. The effect was produced without distortion by projection from a full-size stage. And then there were all manner of optical illusions, in one of which a constant supply of £1 notes was offered to the visitors. Unfortunately, however, they disappeared as one endeavoured to grasp them. But we must pass on to a short account of a few of the exhibits of interest to the gas industry.

How Good Burners are Made.

The exhibit of the South Metropolitan Gas Company demonstrated the care and refinement of workmanship exercised in the manufacture of "Metro" domestic lighting burners. All the gauges used for their standardization were on view, and the method of testing the finished burner was shown. The contrast between the light emitted by an ordinary "Metro" mantle and that by a "Metro" daylight mantle was indicated by fitting both types of mantle on a double-burner standard; similar opal shades being used for each arm. Another item of considerable interest on this stand was a "Metro" micro-illuminator. This is the smallest mantle we have yet seen, and has been designed for microscopic work.

Among the exhibits of the Thermal Syndicate, Ltd., was a fine selection of transparent basins, crucibles, and laboratory ware. Of particular interest was a new "Vitreosil" mercury condensation pump. With a backing pump giving a vacuum of 0·2 mm., a vacuum of 0·000002 mm. may be quickly obtained. The speed is about 200 c.c. per second. The design, which is provisionally protected, is compact; the total length

being 25 cm. The pump is water-cooled. A liquid air trap is required to remove the last traces of mercury vapour.

Distance, radiation, and optical thermometers formed part of the display of the Foster Instrument Company. The Foster optical pyrometer is of the disappearing filament type, and is extremely simple and convenient. It comprises a robust telescope containing an electric lamp. The current from a small portable accumulator renders the lamp filament luminous, and the brightness of the filament is varied by a rheostat. The user adjusts the brightness of the tip of the filament till it matches that of the hot body. The true temperature of the latter is then read direct on a milliammeter scale calibrated in degrees Centigrade or Fahrenheit. The telescope, lamp, rheostat, and milliammeter are all combined in one unit. The Foster radiation pyrometer is a fixed-focus instrument, and is so simple and robust that it can be placed safely in the hands of the ordinary furnaceman. It is designed also for producing continuous records of high temperatures; the receiving tube being mounted permanently, and pointed at the hot body. A continuous chart recorder on this stand attracted much attention. By means of an oscillator and an automatic commutator, the instrument can draw two or more records on the same chart, which is thus fully utilized. The record is formed by the periodical depression of the galvanometer boom by a presser bar operated by clockwork. Owing to the small voltages produced by thermocouple pyrometers, good contact at the commutator is essential; and the arrangement includes a simple and neat cleaning device.

A wide range of their instruments was shown by the Cambridge Scientific Instrument Company, Ltd. Prominent position was given to their automatic temperature regulators. These regulators can be applied to control other physical conditions, such as the steam pressures in boilers, gas pressure in pipes, &c.

Holophane Lumeter.

Holophane, Ltd., exhibited their new-model lumeter. This portable photometer is now made in a light metal alloy. The principle is that a special test plate is placed so as to receive the illumination it is desired to measure. The lumeter is then held to the eye like a telescope, and the observer is able to compare the brightness of the test plate with a photometric screen inside the instrument; this screen being illuminated by a standard lamp. A pointer which controls the amount of light allowed to pass on to the screen is moved until there is equality of brightness between the two screens, which appear as concentric discs in the eyepiece. By directing the instrument at any object, its surface brightness can be ascertained.

Among the many instruments shown by Adam Hilger, Ltd., was the Rayleigh interference refractometer. This instrument is designed for work on the refractometry of gases, of which the refractive indices differ so little from unity that a very high degree of sensitivity is required in any refractometer to be used with them. Some idea of the sensitivity of the instrument will be obtained when it is stated that it is possible to detect the presence of 0·01 p.ct. of hydrogen in air. The principle underlying the design of the instrument is that of the interference bands formed by two adjacent slits in collimated light, and observed by means of a telescope. The arrangement is, in fact, a diffraction grating with only two openings. The means whereby the system of bands thus obtained is made to indicate the refractive index of a substance is provided by the sideway shift of the whole band system when any change is made in the optical path of one of the interfering beams; part of the optical path being, of course, the substance under examination. In general the refractometer may with advantage replace the hydrometer or specific gravity bottle when liquid products—such as those obtained in the distillation of coal—have to be controlled. The refractive indices of liquids give valuable information concerning the purity of oils, the strength of aqueous solutions, &c. Consequently the Abbé refractometer shown by Adam Hilger was of special interest. The Nutting photometer was exhibited. In this instrument two beams from a light source are made parallel. In measuring the absorption of a solution, one of the parallel beams passes through a tube containing the solution, and the other through a companion tube containing the liquid used as solvent for the substance under test. The photometer projects on the slit of a spectrometer a double field, of which one half is illuminated by the light which has suffered absorption by the liquid under test, the other being reduced in intensity by rotation of a divided circle. On observation of the resulting spectrum formed by the spectrometer, one accordingly sees a spectrum divided into two horizontal strips in close juxtaposition, of which the one is reduced in intensity by the absorption of the liquid, and the other by the rotation of the divided circle. Attention being directed to a particular wavelength of the spectrum (preferably by isolating it with a shutter eyepiece), the two parts of the spectrum are made to match in intensity, and the reading on the divided circle (divided by the length of the tube of liquid in centimetres) gives the extinction coefficient of the liquid for the wavelength in question.

Chemical laboratory apparatus was displayed by A. Kershaw & Son, Ltd., and among the exhibits of Chance Brothers & Co., Ltd., was a good selection of their heat-resisting illuminating ware.

"Fuel Economy Review."

In the issue just to hand, the "Fuel Economy Review" (which is issued by the Federation of British Industries, at the price of 2s. 6d.) appears for the first time as an annual, instead of, as hitherto, in the form of a quarterly publication. It is felt that the main advantage of the new arrangement is that it will enable the Editor to present to readers the year's progress in matters pertaining to fuel and its use for the supply of heat, light, and power. In his first production of this character, the Editor has been fortunate indeed; for he has secured articles from a number of gentlemen each of whom is a recognized authority in the particular branch of the subject with which he deals. "The Preparation of Coal for the Market" is discussed by Mr. F. S. Sinnatt, M.B.E.; "High-Temperature Carbonization in 1925," by Mr. E. V. Evans, O.B.E.; "Low-Temperature Carbonization," by Dr. C. H. Lander; "Producer Gas," by Mr. N. E. Rambush, M.I.Chem.E.; "Developments in Coke and Blast Furnace Technology in 1925," by Mr. E. C. Evans, B.Sc., F.I.C.; "Industrial Uses of Town's Gas," by Dr. H. Hartley; and "Internal Combustion Engines," by Mr. W. A. Tookey, M.Inst.M.E.

Safety by Using Belt Appliances.—According to H.M. Factory Inspector's Report for 1924, no fewer than 516 men employed on gas-works were injured through falling, while those injured from the same cause in chemical works amounted to 776. To eliminate danger, safety belts should be worn wherever possible. Messrs. A. Hanley, of Sheffield, have studied the safety problem very closely for many years; and their belts and other devices are well worthy of consideration by gas undertakings. Doubtless that 516 figure could be cut down.

Refractory Materials Section of the Ceramic Society.—The Section will meet in the Atlantic Hotel, Newquay, on Thursday, May 6, under the Chairmanship of Mr. Frank West, President of the Society. A number of papers are to be presented, including "Practical Results and Experience in the Drying and Burning of Refractory Materials," by Messrs. F. West and J. W. Fagan; "A Further Note on the Influence of Iron Oxide in Promoting the Inversion of Silica," by Mr. W. J. Rees, B.Sc., F.I.C.; and "The Effect of Temperature on Mechanical Properties of Silica Bricks," by Mr. A. J. Dale, B.Sc. On the following day members will be the guests of Messrs. H. D. Pochin & Co., Ltd., one of the largest producers of china clay in the world.

Removing Tar from a Relief Holder.

A "wrinkle" published in the "American Gas Journal" deals with a method adopted for the removal of an accumulation of tar from a large relief holder; the plan consisting of the installation of a 10-in. nozzle opening on the side near the bottom of the tank. As the bottom sheet was of ⅞ in. tank steel it would well support a heavy nozzle; and one to fit the radius of the tank shell was specially designed. Studs for holding the nozzle in place were first fitted by drilling and tapping holes to such a depth that they did not go quite through the sheet. The nozzle was put in place, fitted to the surface of the tank shell, and the exact inside opening marked off. After this the nozzle was removed, and a groove cut by means of air tools just inside the marked line; this being made to such a depth that the sheet was not quite penetrated. A gasket was then put on, and the fitting tightly drawn into place by the nuts of the stud bolts. The valve was next bolted to the outside of the nozzle, and equipped with a blind flange with a hole in the centre slightly larger than the round shaft of a long chisel bar. With the valve open, it was then only necessary to cut the remaining metal from the bottom of the groove, the chisel being guided into the grooves by the sides of the fitting. A small portion of the metal was left at the bottom part of the arc. The chisel was subsequently removed, and a round bar put through the hole in the blind flange; the plate cut-out being forced back and down into the tank. Rags were used as improvised packing between the shaft of the chisel bar and the hole in the plate. The valve was then closed, and everything was ready.

Will.—Mr. Thomas Potterton, of Ravenslea Road, Wandsworth Common, left estate of the gross value of £20,691.

Extensions at the Staines Gas-Works.—The Gas Light and Coke Company have placed an order with Messrs. Robert Dempster & Sons, Ltd., of Elland, for the extension of horizontal carbonizing and allied coal handling plant, at their Staines Gas-Works. An interesting feature is a modern application of a recording weigher, so that the coal entering the works is continuously weighed as it is travelling along the new band conveyor. Also the new coal plant is designed in such manner as to leave the old coal plant operative while the new is erected in the same surroundings.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Long Distance Gas Transmission.

Sir,—It is with much pleasure that I reply to Mr. F. Southwell Cripps' criticism of my figures regarding the long distance gas transmission formulæ, and more so as it gives me an opportunity of absolving Prof. Weymouth's formula from any blame. The culprit is neither formula I. nor formula II., but the elusive coefficient of friction f, which should read $0{\cdot}0080/D^{\frac{1}{3}}$, instead of $0{\cdot}0084/D^{\frac{1}{3}}$. Mr. Southwell Cripps will find that, by employing the correct f, there is a close agreement between formula I. and formula II.

Table I., Values of A, presents a more serious complication. The diameters of pipes I have given, from 2 in. to 24 in., are nominal pipe diameters. In practice, however, there is some variation; and, strange to relate, pipes below 12 in. are somewhat larger in diameter, and pipes above 12 in. less in diameter, than the nominal diameters—hence the discrepancies between formula and table I.

I admit I ought to have mentioned the actual pipe diameters at the time. Here they are:

Nominal Diameter in Inches.	Actual Diameter in Inches.	A.
2	2·067	242·8
4	4·026	1,459·0
6	6·065	4,349·0
8	7·981	9,046·0
10	10·136	17,110·0
12	12·000	26,840·0
16	15·250	50,850·0
18	17·250	70,660·0
20	19·250	94,660·0
24	23·250	156,600·0

Since A is worked out on the basis of the actual pipe diameter, and not the nominal diameter, my omission is all the more regrettable.

I am very much indebted to Mr. Southwell Cripps for informing me of my shortcomings; and I fully agree with him that, in a matter of such great importance as the future of long distance gas supply, any initial error in the mathematical side may have serious consequences later on.

Harald Nielsen,
Sensible Heat Distillation, Ltd.
"L. & N. Process."

100, *Victoria Street, S.W. 1,*
April 13, 1926.

Wrought Iron and Steel Tubes.

Sir,—I had just finished reading the article in your issue of the 14th inst., describing the visit of the Midland Junior Gas Association to the works of the Wellington Tube Company, when I received a call from the representative of a Tube Company in Staffordshire. On questioning him as to the material used by his firm, he frankly told me they employed steel only, and that they received orders from quite a number of gas engineers. He further stated that few, if any, tube makers used puddled iron nowadays.

In my opinion, the makers of tubes from puddled iron have a wonderful opportunity of increasing business, if they will only advertise the fact in the Technical Journals, and guarantee their product.

H. J. Woodfine, Manager.

Wellington (Salop) Gas Company,
April 15, 1926.

REGISTER OF PATENTS.

Water-Gas Generator with Regenerative Heat Storing Device.—No. 240,406.

Frankl, M., of Augsburg.

No. 23,748; Sept. 23, 1925. Convention date: Sept. 26, 1924.

This invention has for its object to secure greater thermal efficiency in water gas making.

According to the invention, a producer is provided with a pair of alternately acting heat accumulators disposed in flues or chambers in the walls of the producer. Each comprises a set of tubes open at their lower ends which are heated internally by the run gases and externally by the blow gases produced during successive gas generating and blasting periods, and which give up their heat to water injected into the tubes during the succeeding gas generating period to generate the steam necessary for the production of the water gas.

In the preferred form of construction, the flues in the walls of the producer communicate with the central shaft containing the fuel bed through chambers which also communicate with the air blast supply; and the producer is worked by passing air and steam alternately in opposite directions through the fuel bed in horizontal direction.

Drying Gases.—No. 248,841.

Cooper, C., Henshaw, D. M., and Holmes, W. C., & Co., Ltd., all of Huddersfield.

No. 29,826; Dec. 11, 1924.

The main object of this invention is to prevent the corrosion of mains.

The invention consists in subjecting fuel gases to the action of hygroscopic bodies in the liquid state, with continuous or intermittent revivification of the hygroscopic material.

A brush-washer may be used in the process, as is seen from the following description of the plant suggested, of which fig. 1 is a side elevation, and fig. 2 a plan.

A is the brush-washer; B the inlet, and C the outlet for the liquid employed. A solution of calcium chloride is prepared in the tank D and pumped into the washer by means of the pump E connected to the inlet B. The liquid reservoir of the washer is filled with a solution of such concentration as will give desired results by virtue of its partial pressure of water vapour. Dilution occurs in the liquid due to the absorption of water from the gas. A further quantity of solution is now added; and it is obvious that the amount is determined by the necessity for reproducing the original conditions, or making a permanent cycle of operations. The diluted liquor is partially displaced from the washer, and passes from the outlet C into the tank F.

When the operation of introducing the fresh material is completed, the pump is employed to circulate the diluted solution as follows: A continuous stream of the liquid is pumped through a pipe line G, G, returning to the tank F; and it is arranged so that a smaller stream can be tapped off into a trough H having perforations or serrated edges to give a reasonable uniform distribution of liquid along its length. This arrangement is an application of known devices. The divided streams are allowed to trickle down over horizontal tubes J connected at their ends to form a conduit for the heating medium—for instance, live or exhaust steam. The heated liquid is deprived of a portion of its water content by exposure to the air in this manner and returns to the tank F. In course of time a concentration is reached which is suitable for the fresh liquid entering the washer. During the last stages, therefore, the regenerated liquid is gradually transferred to the other tank D. The regenerated solution may be cooled by any suitable means before being pumped into the washer again.

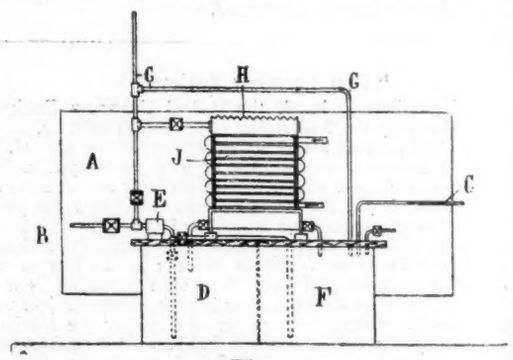


Fig. 1.

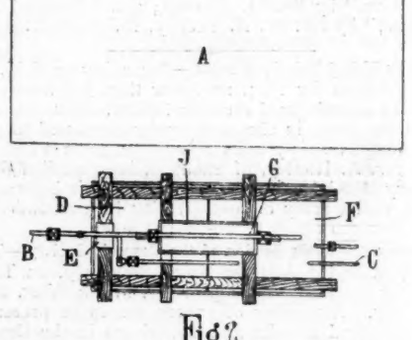


Fig. 2.

Drying Fuel Gases—Messrs. W. C. Holmes & Co.

The periodical introduction of fresh liquid may be substituted by a continuous flow of liquid. For example, the overflowing diluted solution may be caused to pass through the concentration process immediately on leaving the washer, and may be continuously re-

pumped to the washer inlet; the rate of operation of this pump governing the rate of circulation generally. The pump may conveniently be driven by any power unit driving the mechanism of the washer. Continuous circulation would be suited to such types of washers as are designed to contain only a small quantity of wash liquor at a time, whereas the type mentioned in the above detailed description has relatively large reservoirs for liquid.

Such modifications of practice, states the specification, do not affect the principle of the invention, nor does the introduction, in either the first or the alternative methods, of storage tanks to retain a stock of strong or diluted absorbent, or the introduction of cooling devices for the liquid. And instead of the construction of evaporator referred to, any other convenient form of evaporation may be employed.

Stuffing Boxes of Gas Meters.—No. 248,867.

SMITH, E. W., and SMITH METERS, LTD., both of Kennington, Park Road, S.E. 11.

No. 30,633; Dec. 19, 1924.

The object of this invention is to enable the gland of a gas meter, which may be of any desired form, to be in any appropriate position within the meter, and yet permit of easy recharging. This is accomplished by applying to the meter a gland of the type to which a tube is connected through which grease can be forced into the gland by arranging the end of the tube remote from the gland in a position accessible from the outside of the meter casing, and so that connection can easily be made to a grease gun or the like.

Breaking-Down Calcareous Deposits, &c. No. 248,886.

COZENS, A. A., of Fulham, S.W., and THE GAS LIGHT AND COKE COMPANY, of Horseferry Road, S.W. 1.

No. 2488; Jan. 28, 1925.

This invention refers to the treatment of water-laid deposits and incrustations, to facilitate the removal thereof.

The process claimed consists in treating the material with a solution of free citric acid until softening, or preferably a sludge-like condition, is produced, and then removing the disintegrated material. The strength of the solution of the reagent may be adjusted according to circumstances; but for most purposes it has been found that a solution of from 10 to 20 p.ct. of citric acid by weight is convenient. The concentration may, however, be varied as desired, and in some cases 30 p.ct. or over may be found desirable.

The treatment may be carried out at ordinary temperature, but it is better to apply heat, continuously or not. For example, the incrustations to be removed may be covered with a hot solution of citric acid and left in contact therewith without further application of heat until the desired degree of disintegration has been effected; or the solution may be heated during the whole period of contact, whereby as a rule the breaking-up is much expedited. The temperature is preferably maintained below the boiling-point of the solution.

Where fruit, or fruit-waste, of a reasonable content in citric acid be available, the acid may be employed in this natural form—for instance, by digesting the calcareous material with water to which the roughly crushed fruit has been added.

In some cases it may be advantageous to add a small quantity (*e.g.*, from 2 to 3 p.ct.) of an alkali chloride, such as sodium chloride, in conjunction with the solution of citric acid.

Examples are given to illustrate the efficacy of the process.

Pipe Cleaning by Suction.—No. 248,918.

BIRKS, N. A., of Sheffield (and of Abbott, Birks & Co., of London).

No. 5764; March 3, 1925.

This invention relates to apparatus for removing foreign solid matter from gas and like pipes or mains by means of suction. The apparatus comprises a compressible chamber preferably in the form of bellows, the top and base being metal plates. A small cylinder secured to the top of the compressible chamber constitutes a piston. Passing centrally through the flexible chamber and into the small cylinder is a compressed air pipe; its upper open end being provided with a non-return valve, and a cup-leather surrounding the air pipe where it passes through the top of the flexible chamber, making the space below the non-return valve airtight. The bellows is preferably cone shaped in order to make it compact when closed.

The inlet pipe above-mentioned has means for connecting it to the pipe of a compressed air cylinder; and a suction inlet pipe opening into the compressible chamber is provided with a filter. A non-return valve, a tap, and air outlets are arranged where necessary on the apparatus.

Carbonization.—No. 248,967.

RUDE, J., of Lime Street, E.C.

No. 13,284; May 21, 1925.

The main feature of this invention is the circular arrangement of vertical retorts, surrounded by cylindrical shell walls forming flues of which the inner wall partakes, together with the retorts, of an intermittent rotary movement round a central hollow axis through which the distillation gases are removed. The outer wall is stationary, and contains openings for the admission and discharge of the retort heating gas.

Another feature of the invention is the provision for the retorts which first encounter the hot heating gas of larger cross sections than the rest, in order to ensure the same carbonization time for all the retorts.

One object of the rotary movement of the retorts is to bring them in succession to the place where the discharge of the coke into a common cooling or quenching chamber takes place, and where the refilling from a common hopper is effected. Another object of the rotation is to ensure that all retorts successively pass through the varying temperature zones.

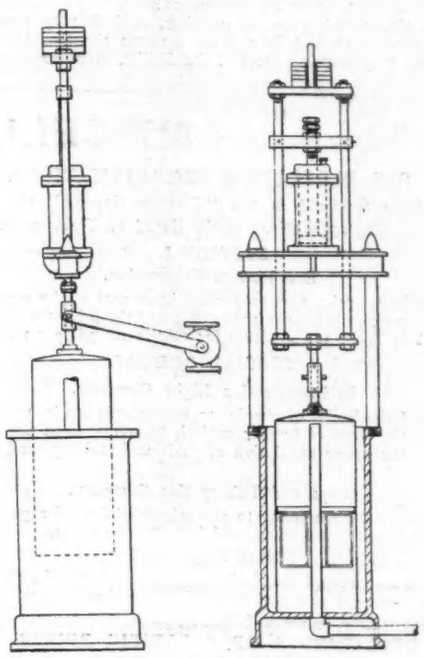
Various other features emerge in the patentee's detailed description of the process and plant. *Inter alia*, he remarks that the machine is applicable for the production of both semi-coke and ordinary coke—in other words, both for low-temperature and high-temperature carbonization.

Pressure or Vacuum Regulator.—No. 249,003.

WALLER, G., & SON, LTD., and HILSON, A., both of Stroud.

No. 19,441; July 31, 1925.

This invention seeks to provide a design of bell-float regulator wherein the rise and fall of the bell-float are parallel to the vertical axis thereof, and the movements of the bell-float and of the speed-regulating gear are damped and rendered less abrupt.



Waller & Son's Regulator.

If reference is made to the elevational drawings which we reproduce, the design will be clear from the following claims:

1. A pressure or vacuum regulator of the type referred to, wherein a rod carries a sleeve with trunnions thereon, and is connected at its lower end to the top of a bell float inverted in a water tank and at its upper end to the centre of a cross-piece, the ends of which are fixed to two bridle rods slidable through holes in a bridge-piece supported by columns on the edge of the water tank; and a lever is pivoted at one end on said trunnions and connected at the other end to a speed-regulating device such as the throttle valve of a steam engine or the shunt regulator of an electric motor.

2. A pressure or vacuum regulator according to Claim 1, wherein the bridle rods have a yoke to which is fixed the piston of a dashpot placed on the bridge-piece over the water tank, and arranged to damp or slow down the action of the bell float and therefore the movements of the lever connected to the speed-regulating device.

3. A pressure or vacuum regulator according to Claim 2, wherein the dash-pot comprises a cylinder, a piston with hollow piston rod fixed to the yoke on the bridle rods and containing a needle valve which is seated in the end of a passage through said piston rod, and is adjustable in position by means of a nut so that the area of the aperture through the piston and the rate of flow of fluid from one side of the piston to the other can be varied and so regulate the rate of movement of the bell float and lever connected to the speed-regulating device.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for April 14.]

Nos. 8929-9536.

CLAPHAM, T. A.—"Apparatus for purification of coal gas." No. 9005.

CLARK, F. W.—"Manufacture of gas from coal, &c." No. 9244.

HINDEN, H.—"Geyser." No. 9134.

MARWOOD, F. T.—"Gas cookers." No. 8995.

PIGGOTT & CO., LTD., T.—"Pipe joints." No. 9260.

SHADBOLT, S. M.—"Recovery of bye-products from waste liquor, &c., from sulphate of ammonia plants." No. 9523.

SOC. ANYE. DES FOURS À COKE SEMET-SOLVAY ET PIETTE.—"Production of ammonium sulphate." No. 9172.

STOREY FOUNDRY COMPANY, LTD., STOREY, J. E. & R., AND TAIT, W.—"Atmospheric gas burners." No. 9356.

TRAVERS, M. W.—See Clark, F. W.— No. 9244.

WOODWARD, J. T.—See Piggott & Co., Ltd., T. No. 9260.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.

Gas Regulation Act.

The draft of a Special Order proposed to be made by the Board of Trade under the Act, on the application of the Brentwood Gas Company, was presented on April 14.

BRITISH-GERMAN GAS MANTLE AGREEMENT.

In the House of Commons on Tuesday of last week,

Mr. Lawson asked the President of the Board of Trade whether he was aware that the representatives of the gas mantle industry have made a mutual arrangement with the German representatives in the same industry for the purposes of stopping imports of mantles into this country for a definite period, and whether he had any information as to the terms of the agreement?

Sir P. Cunliffe-Lister, in replying, said that he was informed that an agreement had been made between the Gas Mantle Trade Association (representing most of the British manufacturers) and the German Gas Mantle Convention and certain associated manufacturers in other countries. Under the terms of the agreement the German manufacturers and the associated concerns would not sell mantles in the United Kingdom and certain other parts of the British Empire, while the British makers would not sell to the Continent of Europe and the United States of America. There were arrangements also in respect of other markets. The agreement was for five years.

LEGAL INTELLIGENCE.

Embezzlement Charge at Tipton.

At a Special Police Court at Tipton, on Friday last, Arthur Lloyd Millington, cashier and general clerk at the Tipton Gas-Works, was charged with embezzlement. He pleaded guilty; and Mr. Stockdale, prosecuting, said that the total defalcations amounted to £113 12s. 10d., and consisted of amounts received from the meter inspectors. Defendant had been employed by the Council for six years; and except for this lapse, his work had been very satisfactory. He absconded, and surrendered later at Wolverhampton. For the defence, it was stated that Millington was willing to make restitution. He was sentenced to three months' imprisonment without hard labour.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

There have appeared in the "London Gazette" the following notices regarding applications to the Board of Trade under the Act.

SECTION I.

East Retford Corporation.

The maximum price now authorized in respect of the supply of gas by the undertakers is 6s. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 3d. per therm.

SPECIAL ORDERS.

Bridgwater Gas Light Company.

To extend the limits of supply, to convert the stock, to make provisions for the issue of further capital, to confer upon the Company powers for the better regulation of their undertaking, and for other purposes.

Grays and Tilbury Gas Company.

To authorize the Company to use scheduled land for gas purposes and purchase additional lands, and for other purposes.

Widnes Corporation.

To define and extend the limits within which the Corporation are authorized to supply gas, and to confer upon the Corporation further powers with regard to the gas undertaking.

DECLARATION OF CALORIFIC POWER.

Dover Gas Company.—500 B.Th.U. (July 1.)

EXTENSIONS AT WEST BROMWICH.

During the course of a Ministry of Health Inquiry at West Bromwich, held by Mr. R. Hooper, into an application by the Town Council to borrow £12,400 for the installation of new plant at the gas-works and the laying of mains, it was explained that the total capital expenditure at the gas-works is £221,660, and the total outstanding debt on the undertaking £42,015. The money now asked for is required for laying mains on the Charlemont Estate (£6400) and for the gas-works (£6000).

The Town Clerk said contracts had been placed for the erection of 350 houses on the Charlemont Estate; and they were to be completed by March next. In addition, the Corporation were selling sites for 96 houses.

The Inspector questioned Mr. J. W. Allin (the Gas Engineer) as to the proposals of the Gas Committee, and ascertained that tenders had already been accepted, because of their anxiety to get on with the work. The tenders, it was pointed out, were below the estimates; and the amount of the loan applied for was reduced to £10,200.

"NEWBRIDGE" AUTOMATIC CONTROLLERS.

It is a sign of the times that gas managers and local lighting authorities are realizing more fully the advantages of gas controllers. Clockwork controllers have now attained such a state of efficiency that their reliability is not disputed, while the advantages of automatic control are also widely acknowledged.

The year 1925 was characterized by a considerable increase in the demand for automatic lighting controllers; and the Horstmann Gear Company, Ltd., Newbridge Works, Bath, report that the greater part of their output of "Newbridge" controllers consisted of the Type 3A/UNI. They anticipate that the demand during 1926 will be equal to, or will exceed, that of last year.

It is gratifying to record that the Company have just received some substantial orders—one from the Newcastle-upon-Tyne Corporation for over 2300, following upon a delivery since last September of over 3200 to the Newcastle-upon-Tyne and Gateshead Gas Company. Another important order just received is from the Reading Gas Company for controllers for the whole of the public lamps; this number being 2400.

The type selected in each case is the popular 3A/UNI, in which the clockwork movement is instantly detachable from the gas cock without disturbing the burner or by-pass, or even shaking the mantle. This feature in no small measure accounts for the big demand for this model, as it is the work of a few seconds only to change the movement and fit a spare: both gas cocks and clockwork movements being interchangeable. The clock runs for 15 days, and incorporates a new high-tensile bronze forging for the main wheel, which provides a high margin of safety and eliminates the possibility of damage in the event of a mainspring breaking through overwinding. The outside cases of the controllers are now made of solid heavy-gauge rustproof steel sprayed with a special cellulose enamel.

Another important feature is the provision of a spring ball top oil cup to the gas cock, which renders it unnecessary ever to dismantle the plug for cleaning and oiling.

Every adjustment, such as winding, setting to time, &c., can be carried out with one hand at the lamp head, leaving the other free to hold the lamp post—a feature of great importance from the attendants' point of view. The operating tappets are arranged to discriminate: it being impossible for the controller to get out of sequence—that is, light up during the day and extinguish at night.

TRADE NOTES.

Meldrum Forced Draught Furnaces.

The present year has opened well for fuel combustion apparatus: and Messrs. Meldrums, Ltd., of Timperley, have fitted their forced draught furnaces—both hand and machine fired—to 43 boilers of all types in a variety of industries—mainly for smoke-cure, reduced fuel bills, and increased steaming.

Tully Plant Orders.

Messrs. Tully, Sons, & Co., of Millgate, Newark-on-Trent, have secured orders for reconstructing the Tully plants at the Kettering and the Colwyn Bay Gas-Works, and for a new installation of their gasification plant for the Burton Latimer Gas Company, complete with the steam boiler and the necessary buildings and foundations.

"Gas Lighting at Home and Abroad."

For some time past Messrs. William Sugg & Co., Ltd., have realised that their friends in the gas industry would be greatly assisted in arranging lighting contracts if they had already to hand pictorial examples of similar installations. They therefore set themselves the task of procuring a large number of photographs, and have reproduced those showing public lighting in the form of a book entitled "Gas Lighting at Home and Abroad." This publication should do a great deal to promote the use of gas for lighting.

The "Consummate" Evaporative Condensing System.

Messrs. Edward Deans & Beal, Ltd., of 3, Monument Street, London Bridge, E.C. 3, have published a booklet dealing in considerable detail with their "Consummate" evaporative condensing system. Briefly the principle of the system is as follows: Steam from the engine flows into one or more coils of tubes, the outlet ends of the coils being connected to an air pump, by which a vacuum is maintained. Water flows over the tubes in a thin film; the exhaust steam imparting its heat to the film of water outside. By this transfer of heat the steam is condensed; the heat given up by the steam evaporating a portion of the water.

New Steel Pipe Works.

Stockton will be glad to learn that the large steel tube works (the only one of its kind in the North of England) which has been under construction for the last year at the South Durham Steel and Iron Company's Malleable Works, is expected to start manufacturing at the beginning of May. The Company have been successful in securing some important contracts, including the supply of several miles of 42 in. steel pipes for the third instalment of the Vyrnwy Water Supply, for the Liverpool Corporation, together with 24 in., 30 in., and 40 in. steel water pipes for the Manchester Corporation, and also an important section of the steel piping required for the new undertaking of the Dublin Corporation Water-Works. A feature of these contracts is the means adopted for the protection of the pipes against corrosion. All the pipes will be lined with what is known as the Talbot patent hydrocarbon process.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

The past week has seen what might almost be termed a phenomenon—a weakening of the market in spite of little or no progress in negotiations for a settlement of the situation which will come to a head next week. The weaker tone is not for forward positions after April 30, for which buyers continue to display no anxiety. But for prompt shipment for this and next week the demand is proving extremely disappointing to those collieries and merchants who have been holding small balances in the hopes of higher prices. This may be due in part to the opinion still prevailing that a stoppage may be somehow avoided, but in large measure it is because of the indifference of foreign markets. Possible other sources of supply are so numerous that Continental consumers are not worrying.

Wear Special gas makes now quote 19s. to 20s. f.o.b., and best qualities are 18s. 6d. to 19s.; the higher quotations of recent weeks having failed to bring business. Seconds are easy at 15s. to 15s. 6d. Good coking coals are easy at about 15s.

Prospects for May, in the event of no stoppage, are poor. Most collieries have very few orders on the books, and Continental buyers are booking their requirements in other markets where delivery is more certain.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

The situation in the coal trade is somewhat obscure owing to the protracted negotiations between the owners, the miners, and the Government. It is apparent that either a last-minute settlement will be effected or there will be a stoppage. So far the latter seems to be the more likely eventuality.

Business in Yorkshire and Lancashire during the past week seems to suggest that those in the key industries are viewing the matter with great anxiety, and in some instances stocks are being quietly accumulated.

Electrical and gas undertakings have, however, sufficient in hand to meet requirements for some time.

The following are the Humber bunker and export prices (f.o.b. usual shipping ports): South Yorkshire—Hards, Association, 22s. to 22s. 6d.; washed trebles, 20s.; washed doubles, 19s. to 19s. 6d.; washed singles, 17s. to 17s. 6d.; washed smalls, 13s. 6d. to 13s. 9d.; rough slack, 9s. 3d. to 9s. 6d.; smithy peas, 19s. 6d. to 21s. 7d. West Yorkshire—Hartley's (f.o.b. Goole), 18s. 6d.; washed doubles, 17s. 6d. to 18s. 6d.; washed singles, 16s. 3d. to 16s. 9d.; washed smalls, 12s. 6d. to 13s.; unwashed trebles, 16s.; unwashed doubles, 14s. to 14s. 6d.; rough slack, 9s. 3d. to 9s. 6d. Derbyshire and Nottinghamshire—Top hards, 21s. 6d. to 22s. 6d.; washed smalls, 12s. 6d. to 13s.; rough slack, 9s. 3d. to 10s. 6d. Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, 18s. to 20s.; furnace coke, 16s. to 17s. 6d.; all per ton.

COAL TRADE IN THE MIDLANDS.

From Our Local Correspondent.

The market is still unagitated. Some consumers who hitherto have declined to depart from their normal purchasing quotas are making eleventh-hour efforts to lay up stocks. There is naturally difficulty in suddenly expanding deliveries of specific qualities of coal, and deliveries are not being accelerated so fast as nervous tension is increasing in individual cases. But taking the market all round, supply is equal to demand at the time of writing. Selling rates remain very much where they were, apart from some comparatively unimportant exceptions where intrinsic values do not apply. The pits have been making a steady output since Easter. As far as appears, the tonnage raised is being distributed with only minor indications of strain such as have been mentioned. Distributors are in no mind to put down stocks on any scale. Some manufacturers are buying above current consumption requirements; others would safeguard themselves, but have not the necessary storage accommodation.

The coke market is slack; indifference is shown by the blast-furnacemen, who are disappointed in the new quarter's demand for pig iron. Consumers have set their faces determinedly against attempts to enforce prices which ruled under the more active conditions of two or three months ago.

EXTENSIONS.

Bridgnorth Gas-Works Improvements.

At a meeting of the Bridgnorth Town Council, the Gas Committee stated that they had considered a report from their Consulting Engineer on the subject of the necessity for enlarging and improving the gas-works. The Committee recommended that the present bench of three beds of six retorts be pulled down and replaced by a bench of three beds of eight retorts each. This contemplated improvement was expected to produce a much greater yield of gas per ton of coal. The Consulting Engineer estimated that the whole of his recommendations could be carried out for about £5000. The Committee pointed out that there was a surplus on the depreciation and improvements account beyond immediate necessities for working capital; but it would probably be requisite to apply to the Ministry for sanction to a loan of about £4000, to be extended over a number of years. In the meantime, the Committee recommended that the Consulting Engineer be requested to prepare plans and specifications and to obtain tenders for the execution of the work now contemplated. The Council adopted the Committee's report.

The Radcliffe and Little Lever Joint Gas Board report that for the financial year just ended the sales of gas represented an increase of more than 8 p.ct. over 1924-5.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *April* 19.

The London tar products market continues without material change. There are still inquiries for pitch for this season's shipment; but there is practically nothing available. The price is firm at 87s. 6d. per ton; the figure for Oct.-Dec. being 80s. per ton.

Creosote is firm at 7¼d. per gallon net and naked at makers' works.

The spell of dry weather is creating a big demand for tar, and record quantities are being delivered.

Tar spirits are rather firmer; pure benzole and pure toluole being 2s. 3d. per gallon, filled into buyers' packages. Solvent naphtha 95/160 is firm at 1s. 10½d. to 1s. 11d. per gallon.

Pyridine bases is quiet at 18s. to 19s. per gallon.

Tar Products in the Provinces. *April* 19.

The markets have been quiet throughout the past week, and among buyers generally there appears to be a strong desire to purchase as little as possible until the coal situation has been definitely cleared up.

Pitch is still quiet, with practically no business passing for this season's delivery. As regards next season, buyers indicate 70s., which at present sellers do not appear willing to accept.

In creosote there is no alteration; it remains steady at ruling prices. Water-white products are still firm, with a good demand for both prompt and forward delivery.

Carbolic crystals and cresylic acid are all neglected, and little or no business is passing.

The average values for gas-works products during the week were: Gas-works tar, 54s. to 59s. Pitch, East Coast, 80s. 6d. to 82s. 6d. f.o.b. West Coast—Manchester, 73s. to 75s.; Liverpool, 74s. to 76s.; Clyde, 79s. to 81s. Benzole, 90 p.ct. North, 1s. 8¼d. to 1s. 9½d.; crude, 65 p.ct. at 120° C., 1s. 1d. to 1s. 2d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 8¼d. to 1s. 9½d. Toluole, naked, North, 1s. 8d. to 1s. 9d. nominal. Coal-tar crude naphtha, in bulk, North, 8d. to 8¼d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North, 11½d. to 1s. 0¼d. Creosote, in bulk, North, liquid, 6¼d. to 6½d.; salty, 6d. to 6⅛d.; Scotland, 5¾d. to 6d. Heavy oils, in bulk, North, 6¾d. to 7d. Carbolic acid, 1s. 4d. to 1s. 5d. prompt. Napthalene, £11 to £14; salts, £4 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Nitrate of Soda.

In their fortnightly nitrate review, dated April 17, Aikman (London), Ltd., say: The tone has continued dull throughout the fortnight, and apart from a few sales of due and near liner parcels at £11 13s. to £11 11s. 6d. per ton c.i.f., business has been negligible. A better demand has been in evidence in Belgium, Italy, Scandinavia, and Central Europe; but the volume of sales has been less than might have been expected in the height of the consuming season. In France sales have been small owing to the preference being shown to sulphate of ammonia. Deliveries in Europe and Egypt for the first half April amount to 66,000 tons, against 79,000 tons last year, making a total of 801,000 tons, July 1, 1925, to April 15, 1926, against 954,000 tons last year. The demand in the United States also continues unsatisfactory, and the latest advices estimate consumption, July 1, 1925, to June 30, 1926, at not exceeding 875,00 tons, against 1,030,000 tons last year. In Europe and Egypt deliveries appear likely to reach about 1,000,000 tons, against 1,170,000 tons, and in Japan and other countries about 175,000 tons against 140,000 tons for the same periods. On the above estimates the world's consumption, July 1, 1925, to June 30, 1926, would be reduced to 2,050,000 tons, against 2,340,000 tons for the previous year.

Devon Gas Association.

The annual meeting of the Association—who own works at Buckfastleigh, Chagford, Chudleigh, Ivybridge, Moretonhampstead, North Tawton, South Brent, and Sturminster Newton—was presided over by Mr. F. Templer Depree. In proposing the adoption of the report, the Chairman said the shareholders would have noted the gratifying increase in the business of the Association. The acquisition of the Ivybridge gas undertaking was a welcome addition, and had placed the balance-sheet figures on a considerably higher plane than hitherto. It was obvious from these figures that the affairs of the Association during the past year had been decidedly healthy, and had every indication of continuing so. With regard to the recent electricity proposals, he did not think these were at all likely to affect the small towns which the Association supplied with gas. Already there was electrical competition in six of the eight towns. The cost of laying cables from any neighbouring super-power station would make the proposition ridiculous commercially. It had been claimed on behalf of cheap electric current that it would help bring back commercial prosperity; but the fact remained that with ordinary manufacturers—and he might take Messrs. Willey & Co. as an example—the total cost of power in relation to selling price was very small. In that firm's case, it was less than 10s. p.ct.; so that if they got the whole of their power for nothing, they could only afford to sell a £100 article for £99 10s. He would therefore advise all shareholders to retain their interests in this Company, and their gas investments generally. Mr. R. J. Rew, in seconding, said it was interesting to note the large proportion of gas consumed in artisan houses through slot meters. Many small gas companies hesitated to extend this class of business; but it was their mainstay. As to housing schemes, it was surprising that architects did not appreciate how much more cheaply gas apparatus could be installed than the more expensive forms of coal cooking stoves, water heaters, and wash boilers. Often, after the latter had been supplied, immediately the houses were occupied the tenants insisted on having gas apparatus; so that the outlay on coal apparatus was wasted. The report was adopted, and a 7½ p.ct. dividend (less income-tax) was declared.

Welsbach Light Company Dinner.

The annual dinner given by the Welsbach Light Company, Ltd., to their Outdoor Representatives, Departmental Managers, and Depôt Managers took place recently in the Caledonian Salon at the Holborn Restaurant, where a most enjoyable evening was spent, with interesting speeches and an excellent musical programme. Mr. J. R. Yates (the Chairman of the Company), who presided, proposing "The Representatives," referred to the great enthusiasm exhibited by all members of the staff, and said that so long as this loyal feeling existed the Company could not fail to meet with success. Lieut.-Col. C. M. Crompton-Roberts (a Director long associated with the Company) proposed "The Welsbach Company," and, coupling with the toast the name of the Chairman, said there was no one—with possibly the exception of Mr. H. Talbot, the General Manager—who worked harder for the Company, or who had its interests more at heart, than Mr. Yates. At the call of Mr. Alfred R. Barford (Senior Representative) the health of Mr. Talbot was enthusiastically honoured. Mr. Barford said that every member of the staff was devoted to Mr. Talbot; and while they had him at their head, enthusiasm must continue to exist, for he instilled it into every one. Before the proceedings terminated, thanks were expressed to Mr. Reginald H. Palmer (the Company's Publicity Agent) for the admirable arrangements made by him for the occasion.

Results at Thornton.—The gross profit on the gas-works for the year ended March 31, 1925, was £3918, against £4315 for the preceding year. The net profit was £1645, compared with £1996 for 1923-4. The net profit is retained in the net revenue account, and converts the deficiency of £615 on March 31, 1924, into a surplus of £1030 on March 31, 1925.

Exhibition at Morecambe.—To-day is the opening day of the Morecambe Trade Revival and Fashion Exhibition; and the Morecambe Corporation Gas Deparment have no fewer than seven stands. All types of labour-saving devices will be on view till next Wednesday. An interesting feature will be a series of gas cookery lectures, given twice daily, by Miss N. Longworth, of London.

Gasworkers' Strike at Glasgow.—The strike of workers employed in the Gas Department of the Glasgow Corporation ended on April 12, and all the men involved have returned to duty. Inquiry will be made into the cases of the men whose dismissal from the service was objected to by the workers, and into any other grievances which may be put forward. A Special Committee has been appointed to deal with the matter.

Co-Partnership in Industry.—On April 15, Mr. T. Noall, of the Cardiff Gas Light and Coke Company, read a paper entitled "Co-Partnership in Industry," before the Cardiff and District Branch of the National League of Young Liberals. After giving examples of co-partnership schemes, Mr. Noall referred to the Cardiff Company, which has 467 co-partners holding £13,402 of stock; and these figures, he said, would be considerably increased when the available bonus and savings for 1925 were translated into stock. At the end of 1903, five gas companies had adopted co-partnership schemes, having 6500 co-partners holding £222,420 shares and deposits. By the end of 1924, forty gas companies had co-partnership schemes, with 36,330 co-partners holding £1,828,784 shares and deposits.

Budleigh Salterton Gas Company.—Mr. R. J. Rew (Deputy Chairman) presided at the annual meeting of the Company, and said it had been a record year; the sale of gas showing the gratifying increase of 10·8 p.ct. There was ample evidence that gas heating and gas cooking apparatus were becoming more and more popular. Although the Company had lost a part of their lighting load by electric competition, this had been more than regained in other ways. The extension of the national electric scheme to the rural districts of Devon was hardly worth consideration at the present time. The Company would shortly proceed to raise further capital to meet developments in the town. The report and accounts were adopted; and dividends of 4½ and 5 p.ct. on the preference shares, and 7 and 8½ p.ct. on the ordinary shares were declared.

Accidental Gas Poisoning at Bournemouth.—That the tap of a gas stove had been accidentally turned on was, at a Bournemouth inquest, recorded as leading to the death from gas poisoning of two persons, an elderly lady and a boy. The tragedy occurred in a bedroom, and concerned Mrs. Artman (aged 68) and her adopted son aged 10. A daughter deposed that she and her sister went out during the evening, and on returning at 11 p.m. noticed a strong smell of gas in the bedroom. The boy and her mother were on the bed, both apparently dead. The tap of the stove, which was very loose one way, they found on. A police witness said that it would not have been possible for the deceased woman to reach the tap of the gas stove with her hand from the bed, but she might, in stretching her limbs, have caught the tap with her foot. A verdict of "Accidental death from coal gas poisoning" was returned.

Preston Gas Company's Extensions.—The Company recently purchased land at Lostock Hall as the site for proposed new works, to meet the growing demand for gas, and to relieve the strain on the Walker Street Works. The Walton-le-Dale District Council, in whose area the new works will be situated, have met the Company in a reasonable manner; and rapid progress is being made with the preliminary details, which involve the laying of a new road, the construction of a branch railway from the Blackburn line into the works, and the preparation of foundations for a gasholder of a capacity of 3 million c.ft., which is being constructed by Messrs. Clayton & Sons, of Leeds. The works will be connected with the main railway by a private line, and will be able to obtain supplies direct from the Wigan and the Yorkshire coalfields. The contract for the new railway has been let to Messrs. Croft & Sons, of Preston. The carbonizing plant will be constructed under the direction of the Engineer, Mr. S. Tagg; and it is hoped to have the plant ready for public supply by the end of 1927. The site is 32 acres, and the total cost of the scheme will be about £200,000.

Gas-Works in Goyt Valley Entrance.

The scheme for building gas-works on a site zoned by the Manchester Town Planning Committee at Horwich End, Whaley Bridge, as an open space, and regarded by many people as the entrance to the Goyt Valley, has advanced another stage; the Board of Trade having intimated their decision to submit to Parliament a Special Draft Order authorizing the Chapel Whaley and District Gas Company to construct works there. As mentioned previously in the "Journal," the application was strongly opposed by the Manchester Town Planning Committee, local councils, church organizations, the managers of two day-schools, the Bleachers' Association, who have two works near-by, and numerous residents, shopkeepers, and property owners. Indignation has been caused by the action of the Board of Trade; and as the Order must lie on the table in Parliament for 21 days, Sir S. Hill-Wood, M.P. for the High Peak, and Mr. J .R. Remer, M.P. for Macclesfield, both of whose constituencies are concerned, will be asked to voice in the House of Commons the opposition of the people. It is now suggested that the District Councils of New Mills, Chapel-en-le-Frith, Whaley Bridge, Disley, and Macclesfield should buy out the Gas Company and supply the whole area from the New Mills Gas-Works.

Cardiff Gas Company's Athletic and Social Club.—The annual general meeting of the Club was held at the Grand Hotel, Cardiff, on April 16. The report states that the sports which were held last July were the best in the annals of the club. On March 31 the balance standing to the credit of the Club was £286. The retiring officers, Messrs. R. G. Shute (Chairman) and T. Noall and H. S. Bartlett (Joint Hon. Secretaries), were cordially thanked for their services during the past five years.

Redhill Gas Company.—The Company are offering to their consumers and employees £25,000 of 5 p.ct. debenture stock. The price is fixed at £4 17s. 6d. for each £5 of the stock. The Company's business is extending rapidly, which necessitates outlay on works, plant, and mains. In 1923 the gas sold was 1,269,819 therms. In 1925 the figure was 1,464,174 therms—an increase of 15·3 p.ct. During the same period the number of consumers increased by 1124, and the gas appliances sold and on hire by 2369.

Gas Exhibition at Dewsbury.—To mark the official inauguration of the new horizontal retort plant at the Dewsbury Corporation Gas-Works, the Department are holding an exhibition of gas appliances—especially domestic—at the Town Hall. The exhibition is to be opened to-morrow by the Mayor (Alderman J. E. Kilburn). There will be model rooms, working exhibits, and free cookery lectures and demonstrations (by Miss Lina Parkyn, of London). The "B.C.G.A." are offering a first prize £50 scholarship and £100 in prizes for gas essay and painting competitions for school children; and the Dewsbury Gas Department have arranged for prizes, in conjunction with the Education Department, in a gas cookery competition for school children.

Haywards Heath District Gas Company.—Presiding at the annual meeting of the Company, Mr. E. C. Charleton said the make of gas in the past year had been 105 million c.ft., and showed an increase of over 21 p.ct. when compared with 1924; but, of course, this larger figure included the consumption in the area of the Cuckfield undertaking, which had been acquired by the Company. The increase in the Haywards Heath district alone was 6·16 p.ct. A final dividend was declared, making a total dividend for the year of 7½ p.ct., less income-tax, leaving £4367 to be carried forward. The Cuckfield Works were definitely taken over on Jan. 1, 1925, and they have since been connected-up with the Haywards Heath Works by a 3 in. high-presure main. At the latter works, a 250,000 c.ft. spiral-guided gasholder has been erected.

Low-Temperature Carbonisation Capital.—Meetings of the shareholders and creditors of Low-Temperature Carbonisation and Gas and Fuel Plants, Ltd., have been convened for May 3 and May 4 to consider a scheme of arrangements for the reorganization and amalgamation of the two concerns and the Barnsley Smokeless Fuel Company. The scheme provides for reduction of the share capital of Low-Temperature Carbonisation from £1,275,000 to £162,150 10s. After setting-out the details, the "Financial Times" adds: "The Low-Temperature Carbonisation Company was formed in 1917 and made a public Company in 1919. No dividend has been paid on any class of capital. In January last a winding-up petition was presented against the Company by the Dursley Gas Light and Coke Company. The last accounts issued covered a period of three years and seven months to July, 1923, and showed a debit balance of £86,612.

The Directors of the Oriental Gas Company, Ltd., have resolved to pay, on May 31, an interim dividend at the usual rate of 3½ p.ct., less income-tax, on account of the year ending June 30 next.

The Blackpool Corporation Gas Department have two employees each with over 50 years' service—J. Spencer, who started in 1874, and F. Hayes, who joined a year later. Others of long service are W. Ormond, with 48 years, and T. Garnett, with 44 years.

At a meeting of the Oswaldtwistle District Council on April 15 Mr. R. Dawson (Chairman) said that the Council had spent over £21,000 on extensions at the gas-works. As a result, they thought they could satisfy the needs of the township for the next twenty years.

A party of fifty students in gas supply of the Westminster Technical Institute, accompanied by Mr. E. L. Oughton, Senior Lecturer on Gas Supply at the Institute, and Sales Superintendent to the South Suburban Gas Company, will visit the underground streets of the City of London, in connection with the subject of mainlaying and distribution. Mr. Oughton says he considers the training of the students is incomplete if they have not seen these underground streets. The party will be shown round by Mr. W. J. Liberty, Public Lighting Superintendent of the City of London, who will explain the various matters of interest.

STOCK MARKET REPORT.

THE Stock Markets last week were still dominated by the uncertainty of the coal position. A little enthusiasm was displayed on the Exchange on Thursday; but the better conditions which prevailed cannot be attributed to any improvement in the relations between the mine owners and the miners, and a satisfactory settlement seems as remote as it was in July of last year. At the time of writing the deadlock in the engineering dispute continues; and there are indications of labour troubles on the railways.

Business in the gilt-edged market, however, was fairly satisfactory, especially in British Government stocks. War Loan, and both the 3½ p.ct. and 4½ p.ct. Conversion Loans, moved up. India stocks were more in demand; it being understood that the fortunate Delhi Umballa Railway stockholders are reinvesting in other Indian securities.

In the Foreign Market, French Rentes, as might be expected, continued to recede; and in the Industrial and other more speculative markets investors appear to be waiting for the clouds to clear.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Apl. 16.	Rise or Fall on Week.	Transactions Lowest and Highest Prices.
£			%p.a.	% p.a.				
171,978	Stk.	Feb. 4	5	5	Aldershot 5 p.c. max. C. .	74—77	..	..
332,992	,,	,,	4	4	Do. 4 p.c. Pref. . .	69—74	..	..
1,551,868	,,	Apl. 1	6½	6½	Alliance & Dublin Ord. .	68—71*	..	70½
374,000	,,	Jan. 7	4	4	Do. 4 p.c. Deb. . .	60—65	..	..
300,000	1	Oct. 22	1/7½	1/7½	Bombay, Ltd.	7/8—1	..	..
170 000	10	Mar. 4	8½	8½	Bournemouth 5 p.c. . . .	12—13	..	..
425,050	10	,,	7	7	Do. B 7 p.c. . .	12—12½	..	12⅞—12 7/16
275,000	10	,,	6	6	Do. Pref. 6 p.c. .	11—12	..	..
50,000	Stk.	Jan. 7	3	3	Do. 3 p.c. Deb. .	55—58	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb. .	75—78	..	..
214,740	,,	Mar. 18	12	12	Brighton & Hove Orig. .	167—172	..	..
244,200	,,	,,	9	9	Do. A Ord. .	130—135	..	..
1,287,500	,,	Feb. 18	5	5	Bristol 5 p.c. max. . . .	85—86*a*	−½	..
855,000	,,	Mar. 18	8	7	British Ord.	100—105	..	103½—104½
100,000	,,	Jan. 7	7	7	Do. 7 p.c. Pref. . .	117—122	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	69—74	..	..
100,000	10	Dec. 17	8	6	Cape Town, Ltd. . . .	6½—7½	..	..
100,000	10	Nov. 5	4½	4½	Do. 4½ p.c. Pref. . .	6—7	..	6⅞
150,000	Stk.	Jan. 7	4½	4½	Do. 4½ p.c. Deb. . .	68—73	..	..
626,860	,,	Feb. 18	6	6	Cardiff Con. Ord. . . .	96—99	..	..
237,860	,,	Jan. 7	7½	7½	Do. 7½ p.c. Red. Deb. .	98—101	..	..
157,150	,,	Mar. 4	5	6½	Chester 5 p.c. Ord. . . .	87½—92½*b*	..	..
79,185	1	Oct. 8	—	†2/-	Colombo Ltd. Ord. . . .	25/—27/-	..	..
24,495	1	,,	—	1/4½	Do. 7 p.c. Pref. .	21/—23/-	..	..
1,513,286	Stk.	Mar. 4	5½	5½	Commercial 4 p.c. Cap. .	77—82	..	77—78
560,000	,,	,,	5/3/4	5/3/4	Do. 3½ p.c. Cap. .	76—81	..	..
475,000	,,	Dec. 17	3	3	Do. 3 p.c. Deb. .	55—58	..	..
800,000	,,	Oct. 8	—	4	Continental Union, Ltd. .	33—38	..	33½
200,000	,,	Mar. 4	7	7	Do. 7 p.c. Pref. .	85—88	..	..
737,150	,,	Mar. 4	6½	6½	Croydon sliding scale . .	95—98	..	..
403,100	,,	,,	5	5	Do. max. div. . . .	79—82	..	..
492,270	,,	Mar. 4	6	9	Derby Con.	107—109*c*	..	..
55,000	,,	Dec. 17	4	4	Do. Deb.	74—76*c*	..	..
209,600	,,	Mar. 4	5	5	East Hull Ord. 5 p.c. .	86—89	..	..
50,000	,,	Dec. 17	—	5	Eastbourne 5 p.c. Deb. .	93—98	..	..
1,002,180	10	Apl. 1	†6	†4	European, Ltd.	5—6*	..	5½
13,788 960	Stk.	Feb. 18	5½	4/17/4	Gas Light & Coke 4 p.c. Ord.	80—82	−½	80½—81½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max. . . .	58—61	..	58½—59
4,157.020	,,	,,	4	4	Do. 4 p.c. Con. Pref. .	74—77	..	75½—76½
5,602,620	,,	Dec. 17	3	3	Do. 3 p.c. Con. Deb. .	57—60	−1	58—59
181,315	,,	—	—	—	Do. 6 p.c. Br'tf'd Rd. Db.	102—104	..	..
130,000	,,	—	10	10	Do. 10 p.c. Bonds* . .	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb. .	..	..	..
83,500	,,	Mar. 18	6⅔	6⅔	Hastings & St L. 5 p.c. Conv	88—93	..	89—90
258,740	,,	,,	5⅔	6⅔	Do. 3½ p.c. Conv.	68—73	..	..
70 000	10	Sept. 24	10	10	Hongkong & China, Ltd. .	19⅞—20⅜	..	..
86,600	Stk.	Mar. 4	10	10	Hornsey 7 p.c.	128—133	..	..
1,976,000	,,	Nov. 19	59	10	Imperial Continental Cap.	137—142	..	139—141
226,170	,,	Feb. 4	3½	3½	Do. 3½ p.c. Red. Deb.	69—72	..	..
235,242	,,	Mar. 18	6½	6½	Lea Bridge 5 p.c. Ord. . .	95—100	..	..
2,127.340	,,	Feb. 18	5½	5½	Liverpool 5 p.c. Ord. . .	78½—79½*b*	..	78½—79½
600,000	,,	Mar 18	7	7	Do. 7 p.c. Red. Pref.	101½—103½*b*	..	..
165,786	,,	Feb. 18	9	8	Maidstone 5 p.c. Cap. . .	115—120	..	..
63,480	,,	Dec. 17	3	3	Do. 3 p.c. Deb. . .	54—59	..	..
75,000	5	Dec. 3	†7	†6	Malta & Mediterranean .	4½—5	..	..
541,920	Stk.	Nov. 19	†4	†4	Montevideo, Ltd.	70—74	..	75
2,061,315	,,	Mar. 4	5	5	Newcastle & Gateshead Con.	72½—72⅝*d*	−1	73
360,929	,,	,,	4	4	Do. 4 p.c. Pref. .	75—76*d*	..	..
529,705	,,	Dec. 17	3½	3½	Do. 3½ p.c. Deb. .	71—73*d*	+1	..
15,000	,,	Mar. 4	11½	11½	North Middlesex 10 p.c. .	155—160	..	..
91,530	,,	,,	8 5/16	8 5/16	Do. 7 p.c. .	112—117	..	..
300,000	Stk.	Dec. 3	7	9	Oriental, Ltd.	98—103	..	..
188,120	,,	Jan. 7	7⅞	7⅞	Plym'th & Ston'house 5 p.c.	110—115	..	..
60,000	50	Mar. 4	14	14	Portsea Island B . . .	90—95	..	..
100,000	50	,,	13	13	Do. C . . .	88—93	..	..
2,389,909	1	—	—	—	Primitiva Ord.	10/6—11/6	+/6	10/11—11/3
302,600	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb. .	84—86	+2	83—85
600,000	Stk.	Jan. 21	4	4	Do. 4 p.c. Red. Deb. 1911	66—68	..	66⅔
193,744	,,	Dec. 17	4	4	Do. B. Aires 4 p.c. Rd. Db.	66—68	..	..
264,496	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	66—68	..	..
150,000	10	Mar. 18	6	6	San Paulo 6 p.c. Pref. . .	7⅛—8	..	7⅞—7⅞
125,000	50	Jan. 4	5	5	Do. 5 p.c. Red. Deb.	43—46	..	..
270,000	Stk.	Mar. 18	5½	6	Sheffield A	97—99*e*	..	..
419,968	,,	,,	5½	6	Do. B	97—99*e*	..	..
1,047,000	,,	,,	5½	6	Do. C	97—99*e*	..	..
90,000	10	June 11	6	4	South African	5—7	..	..
6,609,895	Stk.	Mar. 4	5	7	South Met. Ord.	91—93	..	91½—92
1,895,445	,,	Jan. 7	3	3	Do. 3 p.c. Deb. . .	56—59	..	57½—58½
734,000	,,	Mar. 4	6½	6½	Do. 6½ p.c. Red. Db.	102—104	..	102½
91,500	,,	Mar. 4	8½	8½	South Shields Con. . . .	121—123*d*	..	..
1,187,795	,,	Mar. 4	6½	6½	South Suburban Ord. 5 p.c.	96—99	..	96—97½
368,837	,,	Dec. 17	5	5	Do. 5 p.c. Deb.	94 - 97	..	..
647,740	,,	Mar. 18	5	5	South'mpton Ord. 5 p.c.max	77—80	..	..
121,275	,,	Jan. 7	4	4	Do. 4 p.c. Deb.	69—74	..	..
250,000	,,	Mar. 4	7	7	Swansea 7 p.c. Red. Pref. .	100—102	..	..
200,000	,,	Dec. 17	6½	6½	Do. 6½ p.c. Red. Deb.	100—102	..	..
120,000	,,	Feb. 18	7½	7½	Tottenham District A 5 p.c.	107—112	..	..
882,275	,,	,,	5½	5½	Do. B 3½ p.c.	87—90	..	..
150,000	,,	,,	28/4	5½	Do. 5½ p.c. Pref.	101—103	..	..
181,255	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	74—77	..	..
258,251	,,	Mar. 18	5	5	Tynemouth Con. and New Uxbridge, Maidenhead, &	67 - 68*d*	..	..
197,294	,,	Mar. 4	6⅔	6⅔	Wycombe 5 p.c. . . .	90—95	..	..
88,330	,,	,,	5	5	Do. 5 p.c. pref. .	85—90	..	..
91,800	,,	,,	6⅔	6⅔	Do. 5 p.c. Maidenh'd	87—92	..	..
30,000	,,	Mar. 4	8½	8½	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c. .	123—128	..	..
255,636	,,	,,	7	7	Do. B 3½ p.c. .	103—108	..	..
412,450	,,	,,	5/19/0	5/19/0	Do. C and New	88—93	..	..
352,000	,,	,,	6⅔	6⅔	Wimbledon 5 p.c. . . .	97—102	..	..
98,000	,,	,,	7½	7½	Epsom 5 p.c.	105—110	..	..
88,416	,,	Jan. 7	3	3	3 p.c. Deb.	55—58	..	..

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *Ex. div. † Paid free of income-tax.

Very little can be said of the Gas Section. Business continued on the small side in spite of the many bargains available. Forced sales caused some dealings at exceptionaly low prices. Commercial 4 p.ct. was done at 77, Newcastle consolidated at 73, and South Suburban ordinary at 96. There were no improvements in the quotations of any British companies. The Gas Light ordinary and Bristol maximum dropped back half-a-point, and Newcastle consolidated one point.

The following transactions were recorded during the week:

On Monday, Bournemouth "B" 12⅜, 12 7/16, British 103¼, 104, Cape Town 4½ p.ct. preference 6⅜, European 5½, Gas Light and Coke 80¼, 80⅜, 3½ p.ct. maximum 58¼, 59, 4 p.ct. preference 75⅞, 3 p.ct. debenture 58; 58½, Imperial Continental 140, 141, Newcastle 3½ p.ct. 73, Primitiva 10s. 1½d., 10s. 6d., San Paulo 6 p.ct. preference 7⅝, South Metropolitan 91⅜, South Suburban 97½. Supplementary prices, Liverpool 5 p.ct. ordinary 70½.

On Tuesday, British 104½, Commercial 4 p.ct. 78, European 5½, Gas Light and Coke 80¼, 80⅜, 81, 81½, 3½ p.ct. maximum 58½, 3 p.ct. debenture 58¼, 58⅜, 59, Imperial Continental 141, Primitiva 10s. 3d., 10s. 6d., 10s. 7½d., 10s. 10½d., 4 p.ct. debenture (1911) 66⅜, San Paulo 6 p.ct. preference 7⅝, South Metropolitan 91½, 91⅜, 92, 3 p.ct. debenture 57½, South Suburban 96. Supplementary prices, Danish 7⅜, 7⅝.

On Wednesday, Gas Light and Coke 80½, 80⅜, 3½ p.ct. maximum 58⅜, 4 p.ct. preference 75½, 75⅝, 75¾, 76½, 3 p.ct. debenture 58¼, Imperial Continental 139, Primitiva 10s. 7½d., 10s. 9d., 10s. 10½d., 11s., South Metropolitan 91½, 92½, 3 p.ct. debenture 57½, 57⅞, 58½.

On Thursday, British 104½, Havana El. Ry. 5 p.ct. bonds 99½, Gas Light and Coke, 80¼, 80½, 80⅜, 4 p.ct. preference 75¾, Hastings and St. Leonards 5 p.ct. 89, 89½, 90, Primitiva 10s. 9d. 10s. 10½d., 11s., 11s. 1½d., 4 p.ct. debentures 83, 85, South Metropolitan 91½, 91⅝, 92. 6½ p.ct. debenture 102½. Supplementary prices, Swindon 5 p.ct. ordinary 84.

On Friday, Alliance and Dublin 70½, Commercial 3½ p.ct. 77, Continental Union 33½, Gas Light and Coke 80¼, 80⅜, Imperial Continental 130¾, 140¾, Montevideo 75, Primitiva 10s. 10½d., 11s. 3d., South Metropolitan 91½, South Suburban 5 p.ct. 97⅜.

In Lombard Street loanable credits were in plentiful supply at the end of the week, and old day-to-day loans were occasionally renewed at as low as 3⅞ p.ct. The rate for new money, opening at 4 p.ct, gradually declined to 3 p.ct. The discount market opened easier, but steadied again on the result of the Treasury Bill allotment becoming known. The average rate for these Bills was £4 7s. 10·7d. p.ct., which was slightly higher—4·5d. p.ct.—than the previous week.

The weakness of the French franc was again the feature of the Foreign Exchange Market. After reaching the fresh "record" of 144.90, the Paris rate closed at 144.50. Belgian francs also depreciated further, closing at 131½. The Italian quotation eased to 120.82½. Sterling on New York rallied slightly after an unexpected weakness, and closed at 4.86 5/8.

Silver was a weak market. China was selling, and there were few buyers. The cash price was 20½d. per oz. Gold remained unchanged at 84s. 11½d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on Dec. 3. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3¼ p.ct. at notice.

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